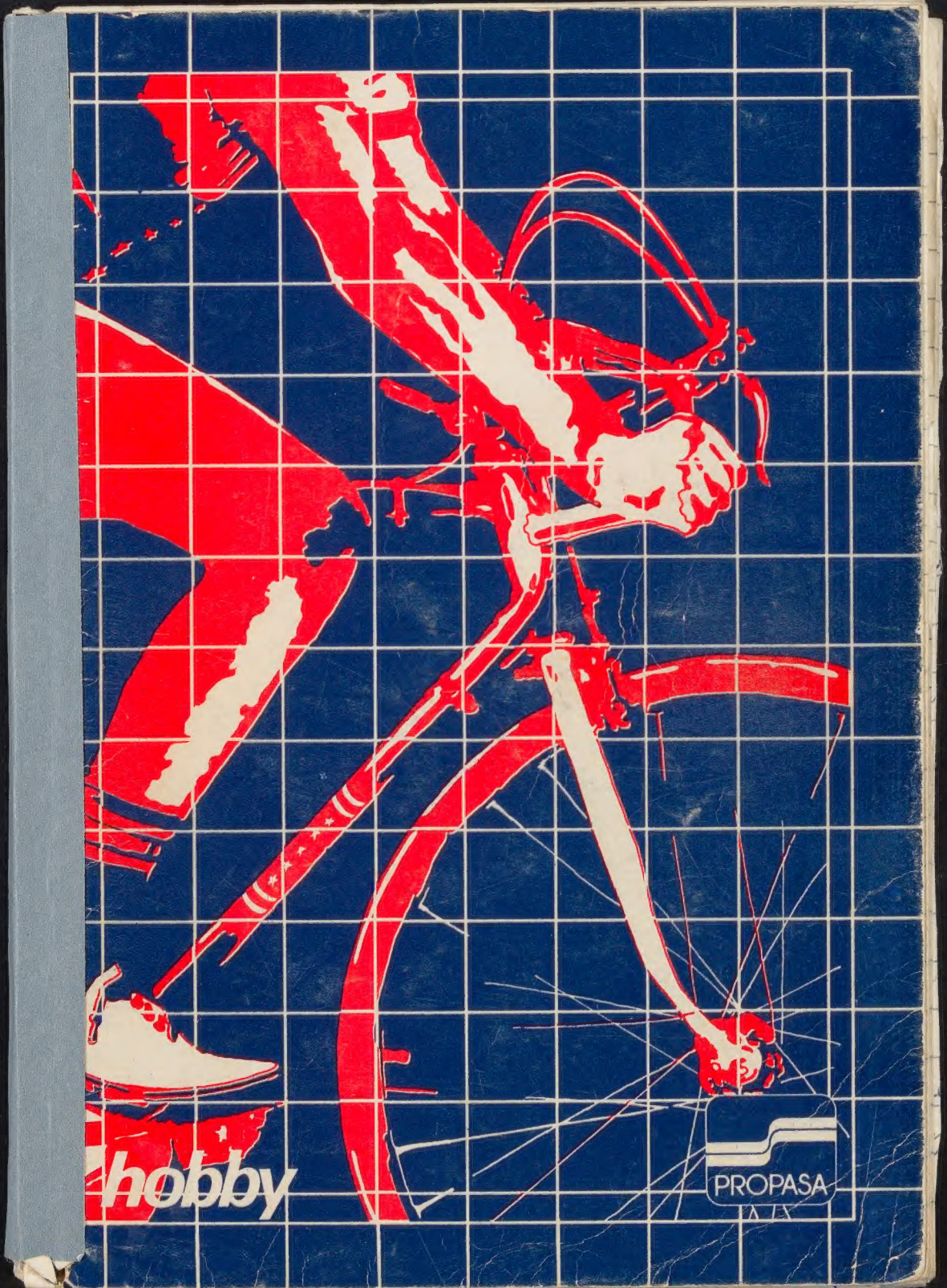

hobby
PROPASA

250,00

Lynn Bohs

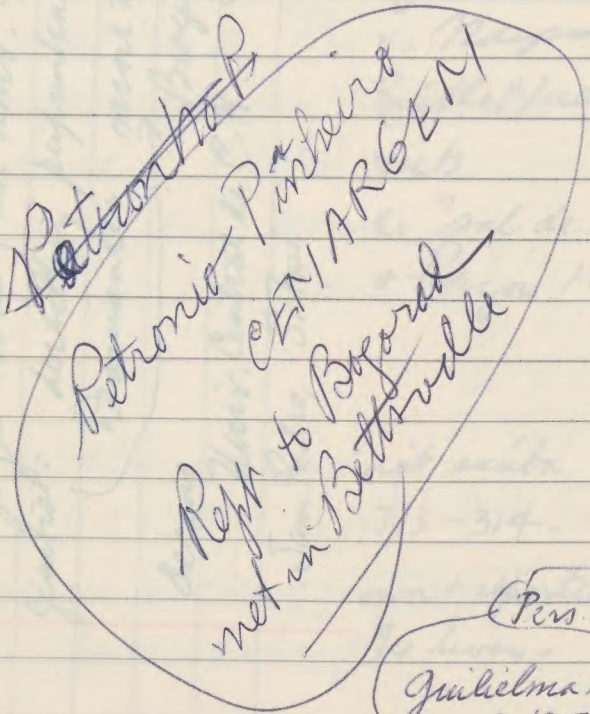
Dr. Gert Hatschbach

Herbario Museu Bot. Municipal

Curitiba

located in Horto Gauberotuba

Hasn't supply funds.



(Pers comm. L. Dinque Gomez)

Guilielma seeds carbonized
→ 10-11-12 centuries

Arqueología de San Agustín. 1a Estación

L. Dinque Gomez + J. C. Cubillos (1981) Fundación de Investigaciones Arqueológicas Nacionales, Banco de la República, Bogotá. p. 30, 32.

Magdalena, Ecuador
also established in C.R. Talk with
Jorge Mora, in Univ. S. José
Geneticist: directing pupunha coll. in Wos
Diamantes more trained than
Brazilians best in
Decano America
Univ. Central de C.R.
San Pedro, S. José

M. J. Balick & D. R. Allen, J. P. Razon 1042
2/78

Asplundia sp., Bora ajíume
"Used to make another type of 'sal de monte' used depending on other sources."

also

Evodianthus funifer
Dept Loreto, Prov. Maynas Río Yaguasyacu, Bella Vista Nuevo.
Bora ohchámub
Use: to make "sal de monte"
Balick, Allen & Razon 1071 2/78

Canavalia used against aaiba Biotropica 11 (4) 1979 pp. 313-314.
Uncaria now being grown + exported to CIBA-GEIGY for cirrhosis of the liver.

Heteranthera camporum ?? Rd. Manaos-Itacoatiara
Caçari, on way to Boa Vista

$$
\begin{array}{r|l}
180 & 3404 \\
\cline{2-2}
 & 18 \\
\cline{2-2}
 & 164 \\
 & 144 \\
\cline{2-2}
 & 200
\end{array}
$$

180

Vocalithes of Compsdendron Herb-Col.

("manídearból") "nanampi". "cacay" "tacay" "cacai"

HJB. 5030 Meta, Río Umea.

5042 " Villavicencio

J. Schunke V. 4451. Dept S. Martín, Prov. Marcial Cáceres, Río Huallaga.

S. López - Palacios 3922 Villavicencio.

E. L. Little, Jr. et all 243 Ecuador Prov. Zamora Chinchipe "semillas todas comestibles" Est. Exp. "La Pradera" cult?

E. L. Little Jr. 464 Prov. Z Chinchipe, Los Encuentros

V. Manuel Patiño 218 Meta, near Guamal.

det ? { M. A Garcia 5. 12 "Meta Huayo" Cerr. Yurimaguas – Tarapoto Dept Loreto, Prov. alto amazonas

H. Pinkley 165. Río Aguarico, Napo, Ec. 2-27-66. Edible fruit seeds roasted.

W. Urbe U. 1354. Aug 2/46. Meta San Martín

Patiño 227 Mar 3/60. Meta. Entre Humadea + Guamal.

The material of Hevea collected on the Embrapa rubber station in Manaos Aug 17/82 RES s.n.,
1 coll. H. Camargoana Ule Manaós. A. yellow, purplish at base. Leaves strongly reclinate. Height 12-15 feet.

H. camporum ? Rodovia Manáos-Itacoatiara, Cascavel, on way to Boa Vista." Flowers yellow. Leaves strongly recl.
2 coll. Height 12 feet." They show much variability and suggest a new var. of H. guianensis ? or a hybrid of H. with Sharm. with H. guianensis germplasm.

Aug. 11, 1982

Museu Goeldi

Hevea Benth.

J.M Pires 16015 10/03/77 Cult. Embrapa Baldwin #23

" 16020 " " " Baldwin

Ducke 9046 5-XII-07 Cachoeira de Egua, 99 Para

Ducke 12249 14-XI-12 Rio Caquetá, boca Rio Miritiparaná. Seringueira chicote

Ducke 9142 13-XII-07 R. Trombetas, Morro de Cachoeira Porticis, Para

N.A. Rosa + M. R. Cordeiro 1522 16/II/77. Terr. Fed. Roraima.

J.M. Pires 16021 Embrapa 10/03/77 Baldwin 341.

Ducke 6779 R. Japurá, Japurá. Seringueira branca 17-IX-04.

Ule 6026 I-1902 Rio Negro, S. Joaquim

Ule 6022 I-02 " "

MR Santos 209 13-3-77 TF Roraima, Rio Xeriuini

Ule 6021 I-02 R. Negro S. Joaquim.

Ducke 1441 17-VII-41 Manaos, Est. do Paredão

Ducke 12360 2-XII-12 Ig. Guarita
Lo Pedrera.

Ducke 12427 22-XII-12 Taruma-miry
Ser. amarella (?)

Pires, Cavalcante & Magnago 14426 30-4-74
TF Roraima, Rio Anauá

A. Stockmann 6/01, 1904 Alto R N., Boa de Siapa, Manaos
" "caucho venezuelanorum"
fornece melhor borracha no S. apa e alto Orinoco"

Ducke 11753 16-V-11. Rio Tamundá, above
Paranapiteriga Para

Ducke 12426 22-XII-12 Seringa preta
Tarumá-miry

Ducke 994 11-XII-07 Rio Japura, Ilha da
Cach de Egoa

Ducke 12424 22-XII-12 Ser. branca
Tarumá-miry Para

Ducke 12425 22-XII-12 Ser. ~~amarella~~ vermelha
Tarumá-miry

Prance, Berg, Bisby, Skward, Monteiro & Ramos
1770 5 miles above Rio Brancinho, Rio Cuieras, Amazonas
Sept 11, 1973.

Ducke 1009 3-IX-42. Estr. da Raiz

Ducke 1017 3-IX-42 " " "

10/03/77

J. M. Pires 16026 Cult. Embrapa. Baldwin 96.
" " " 16013 10/03/77 " " " 306
" " " 16027 " " " 364
" " " 16022 " " " 361

H. Benth. × H. Spruce Docke 1442 17-IV-43.
Est. do Paredão, Dg Guarita

Hevea pauciflora

C.W. Rodrigues 936 Ilha de Flores
17-2-1959.

~~C.W. Rodrigues 923~~
~~27-2-1959.~~

H. pauciflora var. coriacea

P. Cavalcante 3058 29-4-75. R. Negro, Cucui, serra Tunui

Pires 16025 Cult Embrapa. Baldwin 98 10/03/77

B. G. S. Ribeiro 959 15/05/75. Jauareté, Amaz.

O. C. Nascimento, J. M. Pires & L. Coradin 93
08/04/75 São Gabriel, R. Negro.

" " 93A
" 08/04/75. São Gabriel.

Pires 16024 10/03/77. Cult. Embrapa Baldw 188

W. Rodrigues 923 27-2-1959. Ilha da Flores

Ducke 1538. São Paulo Obs. 3-10-44

G. S. Jenman 7578 Nov. 1869. B. Guiana, Kartam Creek.

W. H. Matthews 5 11. [Goeldi 21049] B. G. Rio Jan 1913 Pomeroon

Ducke 1774 Equitos. Carr. de Moronacocha 11-XI-45

Ducke 7424 Equitos 21-III-1906

Pires 16018 10/03/77 Baldwin 99. Embrapa
" 16017 10/03/77 " 88 "

Rosa, Cordeiro 1551. 17-II-77.
TF Roraima; Fazenda Surrão

B. G. S. Ribeiro 930 14/05/75 Jauareté.

H. brasiliensis

M. Silva 1025 7-7-1967 Pará, Rio Mojú

Prance + Ramos 6874 Aug 15/68 Banks of Rio Jamari, Terr. Rondonia, Ph Valle - Cuiabá highway

U.N. Macedo + M.R. Cordeiro 252 09-XII-78. Pará, Santarém

M. Bueno M. Goeldi 2208 30-8-1901 Para, Breves

J. Huber 3291. Para, Hort B.t. 22-I-03

J. Kruyper Surinam, Paramaibo. Cult. Hort Bot. M. Goeldi 21017 1913 Seeds from Colombia.

P. Cavalcante 359 19-7-57. Belem Hort Goeldi, arv. 438.

Ducke 7606 12-VIII-06. Iquitos. (? H. bras. - sterile).

Ducke 7719 9-IX-06. Lower Rio Ica, Bajaussú (sterile H. Spruc. ?)

Ule 5896 X-01 Rio Jurua mirim, Rio Juruá

Ducke 12181 13-X-12 Manáos, Est. de Flores.

E. Snethlage 10016. Tapajoz, S. Luiz 14-X-08

Ducke 12188 14-X-12 Manaos

W. Fox 11846 "fina débil (?)" Oak? Pebas Peru

Ducke 1443 15-VII-06 Rio Javary, Buen Retiro

A. Goeldi 3996 4-IX-03 Purus, Canacury

J. Huber 9397 25-VI-08 Belem, Hort Bot.

" " 1861 A-1900 Aramá, Ser. branca

M.G.A. Lobo, R.V. Illena, B.G.S. Ribeiro 56
03-XII-78. Para, Santarem, Belterra

N.C. Bastos, N.A. Rosa, C. Silva 70 18-03-78
Para, Marajó, Jauaes.

" " 199. Santarem, Belterra 07-XII-78

Huber 2101 Para, Hort. 7/01.

Smithlage 11838 Rio Tapajoz, Boim 17-IX-11
" 11839 " " Pinhel 21-IX-11

Huber 697 22-VII-97 ser. branca loc.?

P. Cavalcante 349. 11-12-1958 Belem Hort Mus Goeldi.

M. Guedes 1947 III-1900 Para, Igapo

Huber 1413 Cello Preto, Porto Alegre Para 10-IV-09

Andre Goeldi 7076 10-I-06. Manaos. Est. de Flores.

Bruchez 12182 13-X-12. Manaos Estr. de Flores

P. Cavalcante 257 19-7-57 Belem. Hort Goeldi

Ule 5813 Rio Juma, Juma Miry VII-01.

Ule 9550 Rio Acre, Seringal S. Francisco VIII-1911

Huber 2100 7/1901 Hort Belem.

Smithlage 11837 17-IX-1911 Rio Tapajoz, Boim

J. Bach 1145 22-XII-03. Rio Xingú, Providencia

Huber 2040 25-V-01 Para, Museu

Huber 1686 XII-'99 Alto Caeta

Huber 2083 30-VI-1901 Para, Jg. Ilná

N.T. Silva & C. Rosario 1943 24-I-79. Para, Marajó
Jauaes

Ducke 12628 17-VIII-1913. Collares, Pará.
" 2878 27-VIII-02. Itaituba
Snethlage 11840. Rio Tapajoz, Pimbal 21-IX-1911.
Ducke 7944 Rio Javary, Buen Retiro 15-VII-06
Ule 5353 X-1900 R Jurua, Bom Fim.
Huber 7250 5-VIII-06. Hort Goeldi
Ducke 11523 21-IV-11 Ser. dos Manaos.
Ule 5354 XI-1900 Bom Fim, Rio Juruá.
J. Nelson 7068 Sept. 1905. Turiassú
M. Guedes 1946 VI-1900 Para, Igapé Ser. branca
Williams 511. (M. Goeldi 21499) 28-8-05 Manaos, Praia Dom Pedro II.
U.N. Macêdo & M.R. Cordeiro 130 02-XII-78 Para Santarem, Capituba
F. Lima 10855 20-VIII-1910 Rio Acara, Igapó. Para
Ducke 12631 17-VIII-1913 Collares, Pará
Pires & Rosa 13258 21/9/73 Peru, Genero Herrera Prov. Requena. Reserva Fovestal.
Huber 2083 30-6-01 Para, Eg. Una Belem
M. Guedes 2246 31-X-1901. Ser. branca Eg. Prato Belem
Huber 68 6-X-95 Ser. branca Para Cult.
M. G. Silva & J. Maria 3260 Mato Grosso, Rio Juruena 2-7-1977.
" " 4289 16/1/79. Mato Grosso, Aripuaña km. 238, nucleo Juara

N.R. Cordeiro 1173 23-XI-1976

Mato Grosso, Fazenda Caolinabo

Franca, Rodrigues, Ramos y Farias 5965 Nov. 28/68.
Terr. Rondônia, Rio Madeira Vic. São
Lorenço mines

Lleras, Steward, Ongley, Coelho, Ramos + Lima
P16580 July 11/73. Cult. Tefé

Franca, Ramos, Farias Oct. 29/68 Amaz Rio
Purus, Labrea.

Franca, Rodrigues, Ramos, Farias 5965
Nov. 28/68. Terr Rondônia, Rio Madeira
Vic. San Lorenço mines.

Hevea guianensis

9-III-79

Pires, Rodrigues, Rosa, Ramzani 16871, T.F.
Roraima, Uraricoera, Cach. Tauxema.

Rosa + Vilar 3169 10-XII-78 Amaz. Maranhão,
Turiaçu Ser. itaúba

G. Nelson 7070 Nov. 1/05. Rio Turiassú Para

Pires, Rodrigues, Irwin 51469. Oct 2/61. Rio
Araguari, Terr. Amapá

M. Silva 877. 14-4-67. Amaz Paraná do Eva
Rio Prata do Eva

Huber s n. (Gold. 10861) 28-VIII-1910 Para Hort.
ser vermelha.

J. Kruyper s.n. (Gold 71018) Surinam. 1913

Ule 5349 IX-1900 Rio Jurua, Marary "orelha de
onça"

Huber 1377 26-X-98. Rio Acayali, Cerro Canchahuaya.
" xiringa d'monte"

Ducke 8728 Serra Parintins 15-IX-807. seringa
itaúba

Huber 1884 II-1900 Arumã-Breves Para. Ser. mangue

Ule 7245 VIII-1901 Rio Jurua, Jurua Miry

Guedes 12486 20-XII-812. Rio Jary, Sta Antonio do
Cachoeira.

" 11841 21 IX-1911 Rio Tapajoz, Pimbal

Ducke 8704 Faro, Pará. 11-IX-07

M.A. Rosa 2435 Para, Marajó, Breves 21-VI-78

Ducke, 8369 Faro 17-VIII-07

W. Fox. (H. glabrescens) 4/III/1911 (Goldi 11849) Jebe debil
Pebas

~~F.M. Pires Cast EMBRAPA Belém 98 10/03/77~~

Ule 5897 ~~XIII~~ 1901 Rio Jurua, Jurua Mirig.

Huber 7020 ~~VIII~~ 1905 Belem, Rocinha

Andre Goeldi 7077. ~~II~~ -1906 Rio Purus, Boca do Acre ser. vermelha

Ule 8900 III 1912 Rio Negro.

A. Goeldi 7075 10/I-1906 Manaos Flores

Ducke 11893 4-VII-12. Alto Rio Zamba.

Ule 5348 XII-1901. Manaos.

Ule 6909. XI-1902 Tarapoto Peru. Cerro de Escalera 800 m.

~~F.K~~ Rita, Santos 2225 01-VIII-77 ~~Amaz~~. Pará, ~~Sfranca 2658~~ Mun. Benevides.

Ducke 0590 3-IX-1907 Faro, Ser. de Juruamuta

Ule 5895 VIII-1901 Rio Juruá, Jurua-Mirig

Ducke 1708 26-VII-1945 ser. amarela Belem.

Ducke 7983 16-XI-06 Rio Cuminá mirim Para.

* Ducke 1056. 23-X-42. Boca do Javari, Esperanza.
it. quem lute

Prance, Steward, Ramos, Monteiro 11213. T. Roraima, Posto Mucajaí, Rio Mucajaí Maminamirim = Uaicá - Mucajaí March 25/71.

Ducke 17042 Hort Breves VI-1918 ser. mangue

Ducke 993 26-VIII-42 Amaz. Borba. ser. estreita ser. vermelha

* Ducke 1434 3-II-42 Esperanza ser. vermelha
it. quem vai luta

* Ducke 898 4-II-42 Esperanza

Ducke 1433 2-II-42, orelha de onça Esperanza

Ducke 1430 10-XI-43. Estr. Aleixo, Manaos.

Cattle has 1/2 gain from Tur. at 600 m. La Lola
1 1/2 coll. gram pl. Guilielma
Gram on cacao - Guilielma is here Turr. 1600
Collection. Grass for pest plants
Resistance bred into pests to control diseases
Control of Venezuela — Upon land cleared up
to eliminate to get Guilielma to
work.

Edberto Camacho yes go worked on Guilielma, did not go far,
stated by Bank Turrialba - Costa Rica's interest
in palmito — even exported. Took over by Mora
Many species types from Peru, Some from Bol. →
best for oil, Study very successful in C.R. — wet
+ export. Fully mechanized production

Clement coming to work in C.R. in guarana.
Clement brother Ben Ackerd. Does not like
Ackerd.

Guilielma produces differently, Slower Utrecht
Hrnat C.R., in sev. diff areas between
diff. places in C.R. with some clones

Have 3 of each introduction

Fracmette accused of being too friendly to
foreigners

Putting together for Workshop in Peru —
Gilbreath

Mora in Albania wants to discuss by
Dorland copy of C.R. Fruits. 1/2 from
Catie. Guanábana. Albania would be
int in Jessenia.

Banana — cacao — coconut —
use Jessenia instead

Italiana + Bra. Expert Cocoa, CR
Thyrsh Mayo.

CATIE has recommendations. Support to serve
C Am — they contribute — get money from
Ser. sources.

Quite diff to cooperate with a group of
countries — no experience — with official
entities.

If cells were here to work on Peru
should start immediately. Applied research
some experience in Ser. crops, esp. Guatemala.
AID pushing CATIE to do something on Peruv.
crops non conventional

Huber 2168 Hook. Bot (from Ucayali) 10-VII-1901
& Iriartea ventricosa.

Huber 1888 II-1900 Aramá Ser. mangue

Prance, Berg, Braby, Steward, Monteiro &
Ramos 17755 Sept 11/73. Acre, Rio
Caeiras, below mouth Rio Branco

Hevea guianensis var. lutea

W. Fox s.n. Goelde 11547 (H. glabrescens)
R. Put. Sombra 24-XII-1910

Spruce 2088 Panuré
Spruce 3139 San Carlos.
Duke. Rio Purus 16-23/VII-40
Ward s.n. (Goldi 21525) 29-6-55 Manaos.
Fox #7. 9-X-1910 Ultimo Retiro R. Put. to Acre Jobe
Duke 573 19-VII-40 Ser. vermelha Ser. Macauba
Rio Purus, Boca do Acre.
Fox s.n. Feb. 1911, R. Put. Libéria H. glabrescens.
Pires, Hill, Pennington & Ramos 24121 Rio
Curaçá Rio Javari, Amazonas. Oct 26/70.

Rosa & Cordeiro 1629 23-II-77 Amazonas Serra Araçá
Rosa & Cordeiro 1654 25-II-77. " "

Hevea microphylla

R.P. Bahia 280 22-III-1980 Para, Belem
[Cult]

Ule 6023 II 1902 S. Joaquim, Ser. Acopó
Ule 6024 II 1904 " " ser. Barreguda
Ducke 7027 2/~~II~~ III 05 Barcellos
Ule 6025 II 1902 S. Joaquim Itambaquiser.

Hevea guianensis var. *marginata*

Ducke 4 10-VIII-43 Ser. Itaúba
Cach. Grande, Manaos.

Hevea nitida

J.M. Pires + N.A. Rosa 13257 18/9/73.
Pau. local Seringa Herrera, Prov. Requena
Reserva Florestal.

O. P. Monteiro + C. Damião 306 11/II/76
Cecre. Cruzeiro do Sul

Pires 16023 Cult. in Embrapa Belem 169
10/03/77

Prance, Pennington, Leppard, Monteiro, Ramos
22958. Oct 15/79. Km. 341 Manaos - Porto
Velho Rd.

Pires 16014 10/03/77 Cult Embrapa Belem 166
" 16019 " " " " 90

Huber 8174 II 1907 Belem Hort. Prov. del
Ucayali - Huallaga Pisca-shiringa

Huber 2167 10/VIII/1901 Para Hort. Peru Ucayali

Ducke 994 25/VIII/42 Borba, Amaz.

Huber 1534 XII-1898 Pampa del Sacramento
pisca shiringa

W. Fox 2 Occidente 2-X-1910

H. nitida

Monteiro & Damião 351
13-02-76.
Acre, Cruzeiro do Sul.

Hevea Spruceana

Berg, Bisby, Monteiro P 19724 Amazonas, Parana do Autaz - Mirim Aug 24/73.

A. Costa 7232 IV/1906 Rio Cowsery.

Ducke s.n. (Goeldi 7910) Para, Trombetas, Rio Cuminá 9-12-1906

Ducke 7910 9-XI-06. Rio Cuminá, Para

Ducke 211 27-VIII-42 Borba

Ducke 6776 15-IX-1904 Rio Jepura, Jupará

Le Cointe 3653 XI-1903 Obidos

Ducke s.n. [Goeldi 7028] 23-6-1905 Barcelos

Ducke 7409 4/VII-06 Tefé

Ducke s.n. [Goeldi 12540] lower R. Negro, Illha dos Papagaios, frente a foz do Rio dos Araras

Ducke 3704 Obidos 25/VII-1903

Ule 8904 Rio Negro, Manaos, Cachoeira Iranduba VII-1910

Ducke 3525 26-IV-1903. Rio Arrayolos Amazonia

Ducke 9152 15-XII-1907. Rio Trombetas, Lago de Jacaré

Spruce s.n. 8-1851 mouth of R. Negro.

Ducke 7711 11/IX-1906 Foz do Jca.

Ducke s.n. [Goeldi 7711] Santo Ant. Jca 11-9-1906

Ducke s.n. [" 12536] Rio Tauemã-mirim, baixo Rio Negro 10-VII-13

Snethlage s.n. [Goeldi 12448] ser. vermelha ?
22-XI, 1912 Rio Yary, Sto Antonio do
Cachoeira
M. Guedes 591 Rio Marauiá VIII-1896
Ule 5347 Rio Jacuna, Bom Fim X/1900.
Ducke 7361 Teffé 23-VI-06
~~H~~ Ule 8904 Rio Negro, Cachoeira Grande, Manaos
VII-1910.
Spruce s.n. 7/1850 Santarem, Pará.
Ducke s.n. [Goeldi 12407] Tarumã-mirim
22-XII-1912

* H. Spruceana x H. Benth.
Parana de Anavilhana abaixo boca R. Apuauhã
23-VII-41. Ducke 829

* H. Spruc. x H. bras.
Ducke 823 Manaos, Flores.

Prance, Maas, Woolcott, Coelho, Monteiro &
Ramos 15101. Oct 11, 1971. Rio Negro between
Ilha Jacaré & Airão

Herbarium in Lucia

H. Iowa R. Ferreyra & E. Cornate 7. 1829
Nov. 20/72. Yanamocha, Cerca a
Pucallpa Hacia, Prov. Coronel Portillo
"Jebepuro"

Cl. Sandyle Sn. Mar. 2nd, 1946. Rubber Nursery,
Tingo Maria

R. Ferreyra 10160 Shitari, Plantacion cerca a Yurimaguas. Sept 21, 1954. Loreto.

H. guaranensis

Abelardo Soturno 101. Set. 23/63.
Hda Delicias, Tingo Maria Huamanca, Prov.
Lamas Prado

Same coll. 81. Aug 20/62 Same loc.

Gentry, Revilla etc. 21035 Nov. 29/77. Prov.
Requena, Near Nichare, above Iquitos on Rio
Nanay. Loreto

H. Iowa. T. Revilla 100 10 Feb. 1976. Requena, Iquitos-
Yanayacu.

Merandia minor

J. Selcuate C. 6848 "Hyrida Carpi"
Quebrada de Cañuto, Rancho Nuevo 1900 ft
S. Martin, Pasc. Manuel Cáceres

M. Spruceana Sierra negra.
A. Acosteguí 021 Jan 11/62. Nicaragua, Chontales, Valentin, Rio Tálamanca
Same coll 079. Same loc. + Dec. 14/62.

M. Spruceana RES + F. Lopez 9284 Ven. Rio Negro
S. Carlos Dec 9/47.

Heterotheca

Viola ~~tricolor~~ ~~jamesii~~ Nicaragua, Chinandega, Rio Tejigueyuca, Brillo Nuevo
Norman, Edward. + Tovar 7263 May 5/77.
Cumulo Blanca. Barbasco de cerro Nacaome Jalcote.
Sand to be transported. Voucher.

Viola lateralis

Cumulo Blanca Norman, Edward. Tovar 7259.
May 5/77.

Herrania nitida R. Foster 3194 + C. Angespenger Ref 20/76.
Madre de Dios Mona, Dept. Mona, Peru
Nac. de Mona, Costa Costa Biological Station

M. amapaensis Murça Pires indet.

D. J. Austin, C. E. Nauman, B. Rabelo,
C. Rosário, M. R. Santos 7365.

diferencia staminas peludas 10-XI-79

TF Amapá, entre Acampamento Carmo
e Cupixi

Mucrandra elata

M Kuhlmann & S. Jambo- 312 28-9-59
Pará, Rodovia Belem – Brasília. Km. 96.
W. Rodrigues, D. Coelho, O Monteiro 55 06 11-7-68
Estr. Manaos – Itacoatiara Km. 155.
~~W. Fox 60 R. Paturnaja, Oriente det? burmeja.~~

Fed. Nac. Col.

H. Booth

F. Rock 23275 June 18/48 Rio Negro

B. Llapur et al 37398 Cerro Nebina Ter. Amaz. Rio Yatua 4th. paper e.t. Jan 29/54

RSS + F.L. 9242.
RSS 8127 Tarapacá Sept 19/46.

8124 Rio Cotuhé Sept 19/46
1/2 way between Buenos Aires & mouth.

Frock 35298 18-IX-44. Rio Xiuhá
23195 Sept. 10, 48 Sept Rio Pará Ter. Rio Branco

~~B. Maguin et al 37~~

RSS. 6154

RSS + FL. 9047a

RSS. 8123.

RSS + FL. 9479

H. G. Barney 14641 Oct 1-4/52 La Pedrera.

RSS. 8128a Rio Cotuhé Encuija Sept 1946.

B. Maguin & La Politi 28427 Jan 17/49. Rio Cuao, Rio Omaca
4th. paper corrected Ter. Amaz. Ven.

RSS + F.L. 10353 Bellavista (from mouth of R. Negro) Sept 1948.

RSS + F.L. 10354 " " " Aug 48

RSS + FL 9468

RSS. 8126 Sept 1946 Rio Sul. Tarapacá.

RSS. 8139 Sept 16/46. Rio Ica, San Pedro
vg Black

RSS. 6551 Tarapacá ~~Oct 45~~ 6559. ~~Tarapacá Oct 1945~~
RSS 6552 " " "
" 6553 " "
RSS 4026

RSS 8090 Est. río Ruiz Cay 7-12/46 Alvarez.

RSS + FC. 9401, 9409, 9364A,

RSS 8133 Rio Jep., 82 km. below Tarapoa Sept 11-18/46.
8132 "anteojuelos real"

RSS 8135 Rio Jep 22 Marzo (below Tarapoa) Sept 11-18/46
Trip. Amaz.

RSS. 6590 Tarapoa Oct 1945

H. braacliensis 1015

J. L. Zarucchi + RSS 1975 Mar. 3 Pozo Nanito, R. Lor.

RSS 6785, 8259a (Isla Ronda, Amaz Cay 26/46); 6792, 6058,
6064, 6389, 6069, 6066.

H. Y. Bernal M. + D. Tello 529. Dept Caquetá
Inspección de Policía La Mono 12 - ~~VII~~ III - 81.

H.G.B. 20737 Cay 23/75 Comunidad Guacamaya, confl.
Río Guacamaya, ~~Antapa~~ Atantapa + Granada.

H. Lingua Jaramillo 2062 Nov. 1945 R. Lloro
2123 Nov. 1945 R. Lloro

RSS 6309, ~~6057~~ 6301, 6113, 6324, 6321, 6792, 6058A, 6075
8557 8563, 8260, 6056, 6330, 6075A, 6076, 8254a (Isla
6357, 6329, 6364, 6196, 6077, 6066 Ronda, Cay 26/46)
6356, 6104, 6037, 8260, 6349, 6060, 6105, 6108, 6106,
6103, 6101, 6200, 6029, 6321, 6058, 6186, 6061, 6065
6152, 6094, 6942, 6106 6057

Allen + RSS 46-187 Rukor X-46

Black 46-56. Estuquiare + Tabatinga 21-VIII-46
46-59 " 13-VIII-46. Tacana, Trop. Amaz.

T.B. Croat 9237 Panama. Entre Huamuhuaya e Tacana Trop. Amaz.

RSS + FK. 10256

RSS + EC 6983 24-31/VII/45 R. Madeira, Ph Velha

RES 6715, 5.n., 6782, 6110, 6945, 10356 (Cult. de Pedreira 26/1948).
8325, 6048, 8058, 6331, 6059, 6086, ~~8254~~ 8254,

H. Spruceana

Froes 24268 10-III-52 Rio Tefé, Maquentána
S+L. 10245, 10242, ~~8144, 8148~~, 10236, 10304,
RES 8183.

S+Black 8161A, 8148, 8153,

Froes 23365 July 6/48 Rio Negro
" 25405 24-II-46 Rio Curuçá, Cach. Lindoia

S+L. 10248, 10305, 10233, 10240

Black 47-1541 29-IX-47. Tefé.

Froes et J.P. Filho 29529 Manáos a Lagoa, Mun. Parintins, 11/III/53

H. guianensis Lutea

RES 8143, ~~5724, 6027, 8141~~

RES 6055, 5736, 5720, 5707, 5750, 6062, 5732
6579, 8122, 5751, 5722, 5749, 5584, 5727, 5718
RES+FL. 9526, 10093, 9799.

C. Ranghel s.n. Venecia, Rio Orteguaza, Caquetá
sin fecha

" " 87A Venecia, July 1942

" " 70A La Palmera, Montañita. July 1942
H. Suaveolens Caquetá

H.G. Bauxi 14044. Dec 1-15/51. entre Kanamarí y Paca. R Apaporis.

H. regalifolia

RES+FL 9665, 10119, 10130, 10120, 10118, 10122

Froes 28132 24-III-52. Rio Seara, Tumá.
28059 27 III 52 " " Praia dos Patos

RES+M.P. 9080

H. Brasil X H. Spruce.

S+L. 10261. Campo Exp. Pacaas de Eva, Manáos
10260 Aug 1948.

H. nitida var. tenuicalendrodes

G. Bauxi, S+Bahia Vasconcelos.
15831 June 25/58

H. Reagi 764 Pepucú, Misiones 10 julio 1943

Black et Rés. 46-140 Río Ivor. x-46.

Black 46-51 Tacuara 23-VIII-46.

H. guianensis

Froés { 23568 / 25527 } 27-X-49. Rio Tocantins

RES 5721, 6057, 8163, 5717, 8236, 8164, 6335 8236 8092
6519A (Tarapoá, Oct 1945), 8390, 6586, 6587, 8142, 6570, 6391, 6382
6591

Romero C. 5465, 7-16 Nov. 52. Sierra Jegajoa. Pará.
" " 4203 May 5/53 Caquetá, La Tagua

Black 47-1582 1-X-47. Taffé.
" 46-33 20-VIII-46 Leticia.

Raquel S.N. Pk Rica, Río Guayas, Caquetá. no date

J. Schunke V. 4903. May 16/71. Dpt S. Martin, Prov. Mariscal Cáceres, 4 Km. de Puerto Pizana "shunga blanca"

H. Barclay 4789 7-26-57. Puerto Asís.

RES 6586 (?) H. guianensis
RES. 6872A

Hevea microphylla

Schultes 4591, 9757, 9690, 9769, 10044 AC Río Guamuez, Río Naquiemi, 8888, 10171, 9608 June 1948.

Black 47-931. Belterra 26-VI-47

Froes 23337 July 8/48. Rio Negro Rio Caurés, Igarape Maraté

Duque J 2550 Cab. Hamacaspana Dic. 30/45.

Hevea nitida

RES 5864, 6908, 9418, 5107, 5874, 8066, 10218, 5812

A.S. Barclay, RES + IC. Rio Kadiyarí Sept 6-8, 1938.

Hevea pauciflora

RES + FL 10089, 9813, 9194,

H. pauciflora coriacea

RES. 6859, 6573, 9490, 9493, 9494, ~~10134~~
6891, 6888, ~~9543~~ 5252, 6870a, 9577.

RES + FL. 9543A, 9488A, 9489, 10136A, 10134, ~~6585~~ 6585
9541A (Cauc), 9874, 10098, 9383, 10196, 9495, 9469.
Froes 21320 Rio Araçá, Cach. Itapichy, Icana. Nov 3/45

R.E. Acero 226 May 29/79. Amazonas, Rio Atapabo.
Guainia, Cacaual.

RES + FL. 10137A, ~~8552~~ 10220, 9386, 9519, 9501, 9381, 9575

(RES + FL. H. pauc. cor. X Hevea.
10095, ~~8~~)

A. Fernandes P. 2016. Jan 27/53 "Yeça" em Kanipaka
Campos, Rio Uneiuxi, São Joaquim
2092 Campos, R. Uneiuxi, Mariajuri.

British Guiana Potaro River Forge. May 19/44
B. Maguire + H. B Fanshawe 23552

Quality Control INPA Board
Full time employee

CEMARC control in the 50's generally similar to
that now in use - developed in 60's.
FINPA time to report. Same time at Tupelo Miss.
Same at Bureaventura.
Lack of continuity. Same time of FINPA now.
Lack of funds.

Weld #150 better control of FINPA
Welder 50 to 70 Welders.
Std. high carbon wire. Sent Mary to
CENTRELEC - not to Bolivia - had
no interpreter. Confused students Bolivia
Ind. Lab + returned to work —
the contract.

Entrepreneur who sell training. Skimmed
% of collection, when not on specified expenditure.
Had to recollect. Not Entrepreneurship stuff.

CEMARC training INPA's workers
Republican.

(1) typically taken for Planejto so if it is hard, if it comes from top it is more likely to succeed decisions must come from above in Brazil - opposite of tot. at Brazil's

~~CNPA~~

CNPq = ~~CNPT~~ became

~~CNPT~~ Conselho Nac. Desenvolvimento de Tecnologia e Ciencia

dreri for seeds to augment exports herbarium doesn't augment exports.

could set seed dria but not plant areas doesn't promote export

FINEP ~~top dict of~~ financial board

Delfim Neto ~~as~~ Ministro de Planejamento economic czar.

nothing OK'ed anywhere until passed by him. Has proved to not beat inflation - has failed. Delfim may not survive election - someone will take blame. Said to be in trouble

Itabuna now Embrapa but formerly financed by cacao tax - quasi independant. Now said to be bankrupt. Price cacao fell.

Museu Goeldi

Micrandra minor

W Fox 60 mdte. R. Put. Oriente hurmega.

W. Fox s. n. (Mus Goeldi 11851) 3-I-1911 R. Put.
Nonoyas hurmega

Drake 6762 14-IX-04 Rio Japura, Juparí
seringueira mulatinha

? steud prob. M. minor N. A. Rosa 1320. 10/10 - a 15/12/
Terr. F. Amapá, entre Porto Platon 76.
y Serr. do Navio

M. siphonioides

Ducke 1298 29-VII-93 Manaos, Cach. de Mendes

Ule 6027 ~~5/11~~ 6027 I-02 R. Nepo S. Joaquim
Araraquara

M. minor

* J.M. Pires, W.A. Rodrigues, N.A. Rosa & G. Ramzani 16903
09-III-79. T.F. Rorama, Rio Urariçoera,
Cach. Tocuxema.

O.C. Nascimento 819 28-X-78 Amaz Camanaus.

Pires, Maas, Worlcott, Monteiro & Ramos 16016
R.N. above Camanaus. Nov. 2/71.

Ducke 1463. 11/XII/43 Estr. de Aleixo Man.

Ducke 1589 25/VI/44 Cach de Mendes Man

~~? fol. M 31/44~~

El Espectador - July 19.'82

El congreso ecológico

Aclimatan hortalizas en la región amazónica

Por HECTOR MUÑOZ

Hortalizas de clima frío han sido adaptadas al medio amazónico, exactamente en la región donde funcionó la Colonia Agrícola Penal Araracuara.

Un selecto grupo de técnicos e investigadores colombianos, encabezado por el agrónomo César Marulanda, ha obtenido en cuatro años importantes avances en el campo de la horticultura. Mediante una tecnología barata y sencilla, en sustitución al sistema de producción de hortalizas en invernaderos o bajo cubierta de polietileno, han adaptado al medio amazónico, lechuga, rábano, tomate, pimentón guaymaray, cebolla, fríjoles, rábano, ají y cohombro Araracuara.

Los indígenas de la zona amazónica colombiana han aprendido a cultivar hortalizas en sus parcelas y, aprovechando estos productos, han podido mejorar su alimentación.

Un ejemplo de los importantes progresos alcanzados en el área de Araracuara mediante un sistema de cajoneras con mezclas de tierra, limo, compost, residuos del bosque, cenizas y desperdicios orgánicos, lo constituye la producción de "habichuela metro", que ha logrado producciones entre 54 y 58 toneladas por hectárea.

Otras hortalizas adaptadas no sólo son de excelente calidad, de gran crecimiento, sino que tienen abundante producción.

El doctor Francisco Correa —hombre culto y dinámico— presentará a consideración del Primer Congreso Nacional de Ecología que se realizará en Bogotá del 22 al 25 del mes en curso, un trabajo sobre "La investigación en el panorama de la conservación de la naturaleza". Se referirá a las realizaciones de la Corporación de Araracuara, de la cual es director desde hace cuatro años.

Los objetivos de esta Corporación son los de obtener y manejar los recursos que posibiliten la experimentación, difusión de técnicas y explotación de especies vegetales y animales en los Territorios Nacionales, con miras a su desarrollo, dentro del criterio de evitar daños al sistema ecológico. Igualmente adelantar en los Territorios Nacionales estudios, proyectos y programas destinados a promover el desarrollo económico y social, tanto en aspectos de uso racional de los recursos naturales y de divulgación de tecnologías adecuadas, como en el área de capacitación y extensión.

La Corporación tiene un Centro de Investigación y Experimentación en pleno corazón de nuestra selva amazónica, en el área que ocupó la Colonia Penal Araracuara. En San José del Guaviare y Orocué también posee centros experimentales.

Diez tipos de hortalizas

No obstante las grandes limitaciones ecológicas, de suelos y clima, los investigadores de la Corporación ofrecen diez tipos de hortalizas que se producen satisfactoriamente en la Amazonia, con una tecnología de cultivo desarrollada sobre bases muy sencillas, de fácil comprensión y manejo, tanto para colonos como para indígenas.

Con esta tecnología y la de cultivos multiestrata, no se requieren grandes erogaciones en insumos, ya que todos los materiales se encuentran en la región y los agroquímicos utilizados normalmente en su producción han sido sustituidos por materiales de fácil consecución por los indígenas.

Lo más destacado ha sido la enorme producción de "habichuela metro", cultivada en cajoneras con cubierta de palma.

Plantas amazónicas

También se han hecho avances significativos en botánica, programa orientado al estudio de plantas amazónicas con prospecciones alimenticias, medicinales, agroindustriales y artesanales. Ha sido creado el primer Herbario Amazónico Colombiano; se ha efectuado la selección y siembra de un Arboretum a manera de herbario vivo y como fuente genética para las presentes y futuras investigaciones.

Se han cumplido otras tareas: ensayos agro-botánicos y agroforestales con cultivos foráneos y nativos; ensayos de sistemas de producción y tecnologías adecuadas para el bosque húmedo tropical mediante cultivos multiestrata y sistemas de agricultura migratoria (Taunya) y un banco de germoplasma de cacaos nativos. El subprograma de inventarios botánicos ha permitido clasificar, recolectar y plantar más de 200 especies representadas en fibras (7), maderas (34), frutales (47), aceites (8), colorantes (7), resinas (12), asencias (5), ornamentales (7), medicinales (26), venenos, barbascos y narcóticos (19 especies).

Animales en cautiverio

Desde finales de 1979 la Corporación inició un programa de zoología y zoocría encaminados al manejo y conservación de la fauna silvestre, como un primer paso para frenar la extinción de algunas especies y desarrollar tecnologías de producción y cuidado de algunas especies importantes para las comunidades que habitan en la región de Araracuara.

En la actualidad se dispone de una infraestructura completamente adecuada para estudiar animales como tortuga, charapa, boruga, chigüiro, danta y morrocoy, y se tienen magníficos resultados de estos animales tanto en cautiverio como en vida libre.

El veterinario Luis Carlos Concha viene dirigiendo este programa.

Al mismo tiempo se ha puesto en operación un subprograma de especies menores para el manejo e investigación de curíes, patos y cerdos que pueden beneficiar a los campesinos e indígenas.

Sobre pesca

El conjunto de Araracuara-San José del Guaviare constituye el Programa Casam (Centro de Capacitación en Sistemas Alternativos de Producción para la Amazonia).

En otras áreas de los Territorios Nacionales la Corporación ha iniciado el Programa de Capacitación, con sede en Orocué, Casanare, que busca mejorar los mecanismos administrativos de las Intendencias y Comisarías.

En 1980 se puso en marcha un programa pesquero de Territorios Nacionales fundamentado en los estudios que indican la gran dependencia de la economía presente y futura de las llanuras de la Orinoquia y de la selva amazónica en su sistema hidrológico, ya sea como medio de transporte o de producción de bienes y alimentos. Como parte integrante de este proyecto se adelantan dos estudios básicos: evaluación de pesca artesanal en cinco ríos con potencial pesquero, de los cuales se llevó a cabo el del río Meta (faltando aún evaluar el Guaviare, Inírida, Caquetá y Putumayo), y un segundo estudio sobre el desarrollo de la pesca artesanal y la investigación en el Archipiélago de San Andrés y Providencia, del cual se originó el Centro de Investigaciones Marinas de Providencia.

Así mismo la Corporación adelanta varios programas de investigación conjuntos o mediante convenios con la Universidad Jorge Tadeo Lozano en las áreas de Agrología y Ciencias del Mar; con la Universidad del Tolima en las áreas de Agronomía y Veterinaria y Zootecnia; con Conif en el área de Silvicultura y Agrosilvicultura; con la Universidad Suroriental de Florencia y mantiene estrecha vinculación con otros centros de investigación nacionales y extranjeros en campos específicos.

La Corporación ha patrocinado varias e interesantes publicaciones, entre ellas monografías de Puerto Carreño, Puerto Inírida, San José del Guaviare, Mitú y el Piedemonte del Putumayo, y sobre protección y cría de tortuga charapa, boruga y curí. ■

Mediante una tecnología sencilla y barata, utilizando un sistema de cajoneras, han sido adaptados 10 tipos de hortalizas al medio amazónico.

Indígenas de Araracuara han aprendido a cultivar hortalizas propias de clima frío.

hoy

centro int
teque
inau
edificio in
teque

ASISTE EL SEÑOR PRESIDENTE DE LA REPUBLICA

FELICITAN A LA:

M. Rossiana

Ducke 1560 10-II-44. Amaz. Tocantins

Micrandra Spruceana

Ducke 1057 12-XII-42 Eq. do Crespo, Man.
Ducke 845 18-XII-41 Estr. do Aleixo "
Ducke 1534 10-II-44. Amaz Tocantins

Micrandra Spruceí

F. Cavalcante 675 22-2-59 Ilha das Flôres

Micrandropsis scleroxylon

~~Dra~~. Luiz S. n. 7-12-1955
Manaus, Eq. de Taboleiro
~~Herb no. INPA 3005.~~

Instituto Agronômico Norte.

Flora Camargoana

N.A. Rosa 3606 Pará, Marajó, Salvaterra

Campos de Joanes Floresta de igapó.

Árvore de 7m x 50cm. de circunferência. Látex branco, pouco abundante. Flores masculinas com pedúnculos verde-claros. Base da corola interna e glena vermelho-claro com pontas verde-claras. Flores femininas com pedúnculo longo verde-claro. Base da corola verde-claro com pontas cremes e pequenas manchas vermelhas. Ovário verde; estigma creme. Col. de madeira, Flores F.A.A. Obs. Este árvore desenvolve-se mais no centro do igapó. 20-IV-1980 (varias flores)

Est. Pará. Ilha de Marajó Joanes. Município de Salvaterra. Mata de igapó

Árvore de 12m x 1,26m de circunferência. Flores cremes com bases avermelhadas. Fruto imaturo verde. Col. Toras de Madeira.

N.C. Bastos, N.A. Rosa & C. Rosário 50

15-III-1978

M. A. Rosa 3611. Sambaqui. 20-IV-1980.
Árvore de 2m. de altura x 15cm. de circ. Látex branco, pouco. Flores masculinas com pedúnculo verde claro, pontas cremes, anteras e filete cremes; Flores femininas com pedúnculo verde claro. Corola creme. Ovário verde, estigma creme esverdeado. Fruto imaturo verde (um.) Fruto seco separado (um). Obs. Esta árvore foi coletada no centro de agapo onde a vegetação é aberta e predomina Beckerelia cymosa.

N. T. Silva. 3456 20-02-72
Sambaqui. Árvore de 12 m. e 30cm. de diâmetro. Frutos verdes.

P. R. P. Boucas, 181 11/03/77
Sambaqui. Árvore de 3.5m. de altura e 7cm de circ. Base da flor vermelha, Cresce em agapé dentro d'água, baixa da salsa

Sampaio 180 11/03/77
Arvore de 4m. de altura e 12cm. de circ. Frutos maduros, cresce em agapé, dentro d'água, baixa da salsa

Same coll. 179 date same

Arvore de 3.5 m. de altura e 7 cm. de
circ. Base da flor vermelha. Cresce em igapo
dentro dágua. Baixa de saleiras.

Same coll. 176 + date. Arvore de 3.5 m de altura e 10
cm de circ. Cresce em igapo, dentro dágua. Baixa
da saleiras.

Same coll. + date 177 Arvore de 3m de altura e
8 cm de circ. Cresce em igapo, dentro dágua. Baixa
da saleiras.

Same coll + date 182 Arvore de 4 m. de altura
12 cm. de circ. Base da flor vermelha,
cresce em igapo dentro dágua. Baixa da
saleiras.

Hevea Camporum sin. date
N. T. Silva 1523. T. F. Roraima
Rod. Manáos - Itacoatiara

Micrandra elata

J. Lanjouw + J. C. Jacobsen 2571 10-III-1949
" " " " 2735 16-III-1949

Pires + N. T. Silva 4604 Para - Rio Guamá, acima de Ourém July 1953

M. Kuhlmann + S. Jenipo 312 28-9-54 Rodovia Belem - Brasilia Km 96.
Van Eerden 9 9/10/57 Braunsberg.
E. Oliveira 837 Km. 129 Rod. Belem - Brasilia 30-5-60 "Latex branco, bastante"
" 829. Km. 130. "Latex branco, muito pouco. 29/5/60.
" 505 Km. 129 Rod. Belem - Bras. 13-II-60. "Latex branco abundante."
" 398 Km. 130 "Latex pouco branco" 19-I-60.
Pires 7064 July 1958 Cia Pirelli, Fazenda Uruboca
Nunes, R. L. Pires + N. T. Silva 5268 Para. 7-30/10/56 Para, Brevez
Pires 6883 same loc. July 1958.
Pires 6796 June 1958 Same loc.
Pires 6825 June 1958 Same loc.
N. T. Silva 4363 06/09/76 Tefé.

Micrandra glabra

A.S Pinkus 236. Sept. 1938 – Feb. 1939.

M. Lehmannii

Schultes 9667, 9666, 9664, 9663, 9725, 9153 (1947)
9669

M. menor

Froes 20897 May 13/45. São Paulo Olov } in restinga
" 20914 May 13/45 "

Schultes 8586, 8930, 8959, 8972, 8810, 8837, 8744, 8874, 8875, 8825 (1947) 9603, 9634, 8803, 9190 9188, 9183, 8804

Froes + G. Ol. [illegible] 15-IX-52. Foz do R. Caiari, varzea

Schult. 24564. Rio Negro, Rio Cauaburi, lowe courses "Petiole strongly cabaloid (?) a false posture from latex". Bark weakly + July 5 - Aug. 12, 1957.

Schult. 24570 Ilha Gavião, Off. mouth Rio Branco. Same date.

Froes 34,894 no date Rio Preto Amazones.
" 28284 17-IV-52 Rio Negro, Ilha da Independencia.

Pires, Froes, Silva 5479 7-30/VII/56. Breves, Para

Froes 22762 Nov. VI-47. Amaz. Rio Negro, Preto
" 22697 Nov-I-47 Rio Negro, Padauiry, Tapera
" 22869 Nov. XVII-47 Rio Negro, Preto, Makabi
" 22875 Nov. XVII-47 Same loc.
" 22368 May 19/47 R. Negro, Enaixy
" 21003 May 30/45 Ponta Boa Amaz.

Murça Pires 827 31-X-47. São Gabriel.
Froes 21477 Dec. 3/45 Porto Cabary, Rio N.
" 22425 June 1947 R.N. Barcellos, Ilha Jacaré
" 21682 Oct. 46. Rio Jauaperi, Cruzeiro do Sul, Seca "Chegou a produzir bom caucho" Badejo "para o comercio, porem pouco" "Caucho fabricado a extração"

Check M. minutiflora Rodr. n. sp.
type in INPA.
Rodrigues, Coelho + Monteiro 8508 -
no date. non spec in Rust Agron.

Froes 23306 July 17-48 R.N. Rio Jurubaxi

S. & Lopez 9200

S & Murca Pires 9128 Taracuá 18 Nov. 47.

" " 8960 São Felipe

Froes 22740 Nov. 1-47 R.N. Padauiry, Tapera

S. & M.P. 9076 Iyanoré. 14-15, Nov. 47.

F. Cardoso 431 ~~Nov 46~~. Aug 1947. Rio Kákaro, affluent der Erebato, (Venez) Caura 350 m. caucho kunuli (Maquiritare.

N.A. Rosa & L. Coelho 547 11/11/75. Amaz. Rio Mutum

Schult. 24591 July 5 - Aug 12/67. Ilha Jaricao near mouth Rio Branco.

M. Rossiana

Pires + H. R. Maranhão 5776. 11/03/75.
R.N. Upanéa.

B.G.S. Ribeiro 884 12/03/75 Upanéa.
Mureça 971. R. Upanéa Taracuá 10-XI-47.
Fraca 21677 Out 46. Rio Jurua Amaz. Cruzeiro do
Sul, Badajó.

Rosa 400 25/05/75. Rio Icana
Rosa y Coelho 571 17/11/75. Rio Jutaí, Amaz.
Ducke 1560. Tmontana 10-II-44.
Schwet. 9681, 9048
Schult + Musca 9064, 9058
N. T. Silva 3822 11/03/75. Upanéa, RN.

M. siphonioides

M. R. Cordeiro + J. F. Gomes 1651 30-03-82
Para, Embrapa Baldwin

Ducke 1463 Maracá Aleixo 11-XII-43
" 1589 " Cach. do Meridá 25-VI-44

Froes 23166 Abr. II 48 Tav Rio Branco, Base
Euclides da Cunha (Ven. fronteir)
" 20297 São Luiz Rio Tapajoz Pará Sept 44

E. da Cunha France 3 n. Para Humaitá Sept. 44

Froes 25811 1-X-52. R N. Poz do Rio Canari

Schultes 9639B, 23138, 10123, 9625, 9420, 8700, 9453
9451a

F. Ferreira 57/2 14-2 57. Reserva Forestal Ducke

Schultes & Lopes Vasquez Base of Cocuy 8 May 1948.

Froes 22647 Oct XXV-47. RN Mehi Padauiry
Castanha.

M. Spruceana

Froes 22242 Apr. 27/47. R.N. Icana
" 33191 26-V-57 Repres Maués, Rio Apará Amaz
25238 16-IX-49. Rio Urubá, Serra Jacamin Amaz
22150 Apr. 1947. R.N. Curucuhy.
20305 Feb 22/45 Manicoré

Pires 3606 23-XII-51. Vila Nova, Rio Tapajoz, Para.

J. Silva + Gumercindo S.P. 19 13-09-77.
Belem, Para. EMBRAPA.

Froes y Addison 28640 20-IX-52 Foz do R. Caiari
Serra Mauá

Schultz 8860, 9368, 9364, 9362, 8983, 8704, 8565, 9380
9466, 9454, 9451, 9450, 9554, 9662, 9660, 9644B,
9648, 9649, 10199, 9620, 10226

Pires + Maruim 15940 Alto R.N. 21-03-75

Murca 982 10-XI-47. Taracuá

~~A.T. Silva 3949 25-08-75. Para, regia de Mafé~~

Murca 563. 1-V-47 Serra de S. Gabriel

Froes 20300 Oct 16/44. Tapajoz
34794 March 1945 São Paulo Oliv.
20697 April 1945 " " "

E. de Oliveira 69 7-VI-57 Rio Maués, Amaz.

O.C. Nascimento, J.M. Pires + L. Coradin 18
02-04-75 Uauperé.

jet ?? B.G.S. Ribeiro s.n. 02-02-75. Serra ~~Sue~~ Surucucu
T. Roraima

Froes 20752 Apr. 45 São Paulo
21129 Oct 945. S. Gabriel R.N.
22242 Apr. 27/47. R.N. Icana
22152 Apr. 14/47 R.N. Cucuchy.
25233 Rio Urubú, Serra Jacamin 16-IX-49

Bruce 848 18-12-41 Alepo.
" 1087 12-12-42. Igarapé de Crespo
1554 10-II-44. Tocantins, Ameg.

Murça 930 9-XI-47 Rio Uaupés Taracuá.

.

S. + Lopez 8767, 9324, 8791A, 8942, 9266, 9294

S. + Pires 9062, & 9026

Schultes 9343A, 10222, 10221

M. Spruceí

Black. 15-V-48 R. Icana, Cotiacanga.

Schultes 9464, 9456, 9375, 9373, 9668, 9644c.
8984, 9044, 9024, 9338.

J. & Rodrigues 122 22-II-59. R N. Ilha das flores.

Froes 28246 9-IV-52 Foz do Uaupés
28758 27-IX-52 São Felipe
21396 Nov 16/45 Iauaretê, Icana

Froes & Addison 28605 18-IX-52. Foz do Cauari

S. & Lopes 10181, 9222, 9354, 9358. 9295, 9658, 9674
9289, 9320 (confuse label)

S. & Preis 9057

M. T. Silva 3859 21-05-75 S. Felipe R N.

Murca 840 5-XI-47 Foz do Uaupés
946. Taracuá 9-XI-47
981 Taracuá 10-11-47
1011 Rio Tiré, marmuth 10-XI-47
1055 15-XI-47. Panuré

U.B. Herbarium

Micrandra Spruceana

R. Calvalcante 675 22-2-55 Ilha da Flores

~~Ecta~~

Micrandra elata

E. Oliveira 829 29/5/60 Km. 130
Rod. Belem Brainha

J.M. Pires 5-1972 Vic. of Belem Sept/Oct/1961

~~Aboi 6.5.25~~

Hevea brasiliensis

G. K. Ladeira 340 Cult.
25/10/42

Para 8259 Cult. Ipean, Belem 15-1-43

Para 8210 Belem, Para Jan. 1963.

William S.N (M. Goeldi 21499) 29-8-55.
Amaz Naval Praça X. Pedro II

F Oliveira 1250 19-12-60 Rua Tocantins
S. Joaquim de Itaqui

T. B. Croat 18352 July 23/72 Iquitos,
Puerto Almendra
Rio Itaya

H. Benthamiana

Jill Pires 8257 15-1-65. Cult. IPEAN, Belem

H. Camargoana

N.A. Rosa 3612 22/IV-80
Salvaterra, Campos de Jauaes. Igapó
Ilha Marajó

Arvore de 18m de altura, ft com. de cor. Latex
para branco; flores masculinas com tuba
interna e eterna vermelho-claro, fontes
cremes; anteras e filete cremes - esverdeados,
flor feminina com pedúnculo-verde-claro,
corola verde-claro com pequenas manchas
vermelho-claro, ovario verde. Estigma
creme esverdeado; frutos imaturos
verdes e maduros já caindo. 6 frutos

H. guianensis

Luiz s.n. (M. Goeldi 21525) 29/6/55
Manaos, Planta 10 "sempre verde"
E. Oliveira 102 (10-1-60) Km. 105 Rod.
Belem Brasília

H. guianensis var. *lutea*

Pires 8255 Cult. Ipean Belem 15-1-65

H. microphylla

Pires 8253 15-1-65 Cult Ipean, Belem

H. nitida

Pires 8254 15-1-65. Coll. Ipean Belem.

H. pauciflora var. *coriacea*

Pires 8258 15-1-65 Cult Ipean, Belem.

Rizzini 1774 11/XI/45 Peru, Dep. Rd to Moyobamba

Pires 8256 Cult Ipean Belem

H. Spruceana

Regis 8260 15-1-65 Jean. Belem

INPA Aug 17/82

M. Spruceana

J. M. Pires 1918 July 7/79. R.N. Ribeiro
Rua Siará + Rio Negro Ximaci, 1

M. Rosseau

D.T. Franca et al 6453b. Feb 19/67
Rosario Serra Tapeguem, Ofanzé
Pinna

Rodr. Ofinna 2342 21-8-61
Mandaz Al - Stec Km 55
Rodr. 7951 30-IX-65 " Km 13c.

M. Rosaria

D. T. Pranchetal 10556 Feb. 6/71 Tav. Rod.
Grd. road from Sumauma to Nacca.

R. J. Campbell, J. C. Bayley et J. F. Ramos P2c919
Maio 25/74.

Amazon. Manaus - Porto Velho Highway K. 124

A. Coelho 830 28/11/78. Amaz. Est. Manaus -
Pto Velho Km 103.

P. S. Teixeira 693 3-05-81 abundante capoeira
Serra - Selinões, Tefe

Byron + L. Coelho 584 28/1/78. Est. Manaus -
Itacoatiara K 69.

A. Rodr. 9587 18/09/65. Itam K 109.

G. T. Pranchetal 14310 July 14/71.
Rio Curuquete, Cach. Sta Bento, Rio
Preto, Amaz.

A. Rodr. 8770 Man - Itac. Km 130. 30/X/70.
" 8959 " " Km 130 17/9/70
" 8677 27/1/70 " K 130
Rodr + A. Coelho 8522 22-8-68 " Km 130
Rodr., Coelho A. Monteiro 8522 22/8/68 Km 130
Rodr. Coelho Frias 8522 22/8/68 " K 130

M. minor

L. Coelho, D. Mota & P. Furtado 387
08/11/1975. Cumaj. Colr. Schinia
Rio Bora, aft Rio Gutaí

K. Kubitzki, C.E. Calderón + H.H. Soppendeck
79-226 Sept 10/79. Cumaj. Rio N. Rio Te
46 km. above mouth, Valle Bacuri.

J.M. Pires, W.A Rodr. et al 16903 C9 III/74.
Roraima, Rio Uraricoera, Cachoeira
Tocuxema.

RSS. RN. Silva, off. mouth Rio Branco. July 5 - Aug 12 1967
24510, 24591

RSS 24564 Rio Cauaburi

L. Coelho s/n. 20/01/74. Rio Padauiri, Tapera Cumaj

J. Chagas, D. Coelho s.n. 18-4/56.

Mucrandropsis

L. Coelho, A. Miranda 36,039 Manaus
K 139 Manaus - Itacoatiara 21/11/72

C. P. Monteiro + J. Ramos 935 24/07/76
Estrada Man. - Pt Velho Km 5/5.
Árvore de 20 m de altura x 20 cm. de
diam. Flores cremes.

C. P. Monteiro + F. Mello 511. 04/07/75
Estrada Man. Itacoatiara Km. 135
Arvore de 20 m. de altura por 25 cm. de
diâmetro. Terra firme.

G. T. Prance et all. 15 Set 1974. Km. 168
Br. 174, Manaus Caracarai Road,
Rua in terra firme Tree 12 m x 20 cm diameter.
Flowers cream.

Nº 1. data

Colombia
C. Rod. 320 Río Mesay, Cazuela Chaine Mar 15/76
Naimenegue (Witoto) Arbol de tres reata
con espada de blanco. Hojas de borde violeta
Madera rosada

Guian Fr. Montagne de Kaw 220 - 250 m.
R. S. Conan 28 S.M. Dec 12/57.
(Herb no. 28425)
Tall tree 4 m. Fruit green. Flower pale yellow
green. Infrequent in forest on taipite

J.C. Lindeman + R.S. Conan 6677 dd.
Surinam, Mt. Kasan, Hts 4/1/1955

M. Kahlmann + S. Jouko 312. 28/IX/59
Para: Rod. Belem Brasilia Km 96.

N. Rodrigues 5993 4/11/70 Bosque "N. Montefalco
Amaz. Sup. Manaos - Itacoatiara R. Roxo 11.5 "
Km. 155. Arbol Chico 30m x 45cm.,
Frecuente localmente en suelo de poli humedo
humo-arenoso, húmido, tipo caatinga alto

, pelo de cheiro Tronco sem saliência. Látex pouco abundante, branco, coagulante. Pedúnculo pistilífero terminais. Fruto verde maturo.

W Rodr. 9864 1/10/70 Estr. Nav-Itacoatiara K. 155.

W. Rodr. 9869 1/10/70 " " " Km 155
Arvore grande, comum na mata de terra firme, alto, de solo arenoso. Casca de tronco acinzentada desprendendo-se em placas grandes; entrecasca avermelhada, folheada. Látex branco, relativamente abundante, produzido gotas distintas. Ramulos de ano e pedunculo floral amarelo-ferruginea; Fruto grande verde-amarelhado volumoso.

W. Rodr., D. Coelho, C. Monteiro 8728 " Km 155. 11/7/68.

W. Rodr. " " 8508 11/7/68 same place

M. Diplomados

Rodr. 5913 25/8/70.
Manaus, estr. da V-8.
J. Schunke V 3612. Pens. Dpt. S. Martin,
Nov. 11/69 Prov. Marechal Cáceres
"Nigrito campi" Tocoche Nuevo
Schunke 3937. April 18/70. Sambe.

L. Coche s.n. 22-8-55. Manaus Parque 10
S. Ferreira 57/2 19-2-57 Manaus Rio
Parque Coche A-3
E. Ferreira 57/9 19/2/57 " " A-21
a Caucharana
Rodr. 532. Rio Coche 14-8-57
Rio. Pessoal do CPT s.n. Nobre.
INPA 6097 Manaus, Rio
Rodr. 890 25/8/70. Parque 10 Man.
Li. Fontes & D. Coche 17 7-6-70.
Rodr. & D. Coche 7342 Parque 10
9/12/65
Manaus-Itacoatiara Km 183
Rodr. 653 Rio Cuieiras, Igar. Tucumaré Am.
16-IX-64.
M. Nunes

Rodr. 9861 1/10/70 Km. 155 M.-I.

M. Spruceana

Rodr. 550 29-5-57 Restinga P-41.
" 8997 M.-I. Km 175. 10/2/71
L.A. Maia, E. Soares, stat 533 10/07/79.
Serra Curicuriari
Rodr-S.M. 18/10/51 Morro Santa Rosa
Prance stat-10065 Fl. 18/69. Roraima
Serra dos Surucucus, Posto Surucucu Mission

M. Spucci

Takeuchi 16/1/60. R.N. Boa Canari - Naupes.

P. Cardoante 675 22-2-54. Ilhadas Flores

Rodr. 1030 2-54. alta R.N.

" 918 17-2-54 Ilhadas Flores

Aug 19

Herbarium Amazonense
Univ. Nac. de la Amazonia Peruana

M. minor
A. Gentry & J. Revilla 16691 July 10/76.
Río Nanay, above Iquitos Loreto.

Hevea Brasiliensis
Gentry & J. Arroyo 2587 March/79 Loreto
Prov. Maynas, Mishana Río Nanay, 1/2 way
between Iquitos & Santa María de Nanay.

F. Angulo 1515 1-VII-78 Peña Negra, near Iquitos Maynas Loreto

J. Revilla 2332 Feb. 12, 1977.
Maynas, Puerto Almendra,
Río Nanay above Iquitos.

H. brasiliensis
J. Revilla 1287 8 Aug. 76. Río Putumayo, Mayoc. Petrópolis, 3 Km. above mouth
A. Gentry et al. 21635 29 Nov. 1977. Maynas, near Mishana, above Iquitos on Río Nanay
J. Revilla 2109 Dec 28/76 Maynas, Río Nanay, above Iquitos

H. guan. con leite

J. Ayala 2027 4-X-79

Naranja - Jefe del entre foro

F Ayala ... E: 7-V-72

Guidiksa in C R.

130 yrs ago

Reds in Lanquin

Christian to southern Honduras

Catholic

Kaqyk in Pac'aite.

Alta Verapaz

Chac

Lanquin

Quiriguá

Motagua

Rio Dulce

F. Ayala 0439 27-IX-73.

Nayas, Epistas, Ca r. a Zungarocha

f Ca "

Gr
Fl
Ml

Ienba
Epistas
ensis
ta

Tres
Andubtor d Trupperin
" Mucodes R.
Sa Jorquilla
Sea mucha.

Cotby Ecotoya
Otx h
Chupa f. fit Ecotoya Pa
topin.

F. Ayala 0439 27-IX-73.

Nuñez, Ignacio, Carr. a Zuleyamacha
"Jebedibal"

J. Rivella 100 10 Feb. 76. Ignacio, Guayaquil

F Ayala 1963 24-IX-79 Quisapincha, Ignacio

M. Reinaldi Y. 4603 Sept 10/79. Shirungo inside
Ignacio Rio Nanay below-Bellavista

Herrania nitida

P. Soin. 89 2-12-79

Cahuana Rio Pacaya Peguera Loreto

H. Murphy 1 July 1981.
Rio Itaya, Sanamgal.

F. Ayala 2135 23-X-79 Andoas, Loreto
Dpt Loreto

F. Ayala 1877 23-VI-79 Quintoconcha
Nauta, Loreto.

Theobroma speciosa

Gentry + Ayala 15574. Jan 4, 1976.
Nauta Rio Amazonas, trail Iquitos
to Iquitos with Rio Nanay.

M. Rimachi Nauta, Loreto, Amazonas, Río
Napo, San Alejandro Sept. 26/79.

F. Ayala 154 26-X-72 Nauta, Loreto
Peruana
"pucha de agua"

Ayala 10680 10-X-74 Nauta, Loreto
Acuradero - La Loretana, Iquitos

Banisteriopsis caapi

Ayala 0009 24-VIII-1973 "Se la utiliza como planta alucinógena junto con yagé, toé, Datura" Quistococha 24-VIII-73

Ayala 00779 16-XII-74 Pto Almendras, Iquitos. "Ayahuasca"

Monday,
August 23. Bogotá.

In spite of the many official events connected with the inauguration of the new administration, I was able to visit with Dr. Jaime Navas A., subdirector of investigations of ICA (Instituto Colombiano Agropecuario and Colombian representative in REDINAA. Dr. Navas felt that REDINAA could easily include more perennials in its program, since at present they have only three: rubber, cacao and the African oil palm. He expressed the opinion that the Amazon needed more tree crops, fewer annuals, and assured me that Colombia would be much interested in a real program on Jessenia and especially Guilielma. He expressed the hope that there would be free interchange of germ plasm. In response to my question as to where in Colombia a germ plasm bank of palms might be located, he stated that he felt that the Centro Experimental en Macagual, near Florencia, about 1000 feet altitude with four meters of rain a year would be ideal. Of other germ plasm banks are located in such areas as Llanos and Yurimaguas, & believe also that the Macagual station would offer a

greatly different environment to study growth, of the palms under completely different conditions. He also stated that ICA has another experimental station in the Llanos at Carimagua, one hour from Las Garzetas, but that this locality would, like Las Garzetas, be extra-Amazonian.

Dr. Navas showed real interest, especially in Jessenia, of which he knew less than he did about Guilielma and saw no reason why, in the next meeting of REDINAA it could not be proposed as an additional perennial crop for collection. In fact, he indicated that in the last meeting of REDINAA, it was suggested that additional palms (Guilielma, Jessenia, Astrocaryum, Oenocarpus, Mauritia, etc. might eventually be of interest. He felt that the door was thus open for including Jessenia. Apparently several different institutions or entities have at times past (eg., the Botanical Garden at Cali) have begun germplasm collections of Guilielma — not to mention the several in Brazil and Costa Rica now active (See attached xerox pages from the report of the last REDINAA report.).

I attempted to consult with an Ing. Agr. Ignacio Bustos of

Corporación Nacional de Investigación y Fomento Forestal.

COINF, who had once initiated a short-lived collection of *Teasenia* in the Buenaventura area of Colombia. He was out of Bogotá for several weeks.

Repeated attempts to reach Mr. Victor Patiño by phone finally were successful, and he agreed to fly to Bogotá tomorrow for discussions with me.

It was possible to have a long telephone conversation with Dr. Armando Samper, agricultural agronomist at CIAT, who was in Bogotá, completely occupied with the presidential and other official efforts connected with the inauguration of the new administration. Dr. Samper, a personal friend of mine for over 30 years, was instrumental in organizing (when he was director of COINF) the short-lived *Guiliclima* germplasm collection. He indicated enthusiastic support for any renewed effort to collect material of palms for future economic use and as crops for the humid tropics.

Sunday, August 22. Bogotá.

Fortunately, I was able to confer with Dr. Pablo Lugari, director of the Centro Las Gaviotas in the Colombian Orinoquia, even though it was not a day of work.

Dr. Lugari has long been interested in Jessenia and financed much of Dr. Michael Balick's doctoral field work on the biology of this palm in the wild state. During Balick's work, many ecotypes of Jessenia were established at Las Gaviotas, a model town in the llanos and in which truly surprising new approaches have made it almost self sufficient. Amongst the many novel experiments at Las Gaviotas, Lugari has had Dutch technicians install very rudimentary presses which now are producing from the wild populations of Jessenia enough oil for local use. Few of Balick's seed introductions of ecotypes survived, since, with a lack of adequately trained technicians, the seeds were planted in the full sun. But Lugari is still 100% convinced that Jessenia is the crop of the future for the humid tropics.

Fergari would be interested in facilitating space for a Guiana - Guillermo green plan look at the Garitas if proper technical personel of an agronomical nature could be supplied to supervise the planting and care of the material; this does not fall within the budgetary limitations. One drawback to a green plan that at Las Garitas would, from the viewpoint of REDINAA, be its situation outside of the Amazon - in the Orinoquia. A check in such an exceptionally different environment as the llanos (where both species grow spontaneously now) might, however, be agronomically of great interest when one considers the conditions which would be unlike those - soil, rainfall, open grasslands, etc - in any Amazonian tank.

One very pertinent point of importance is Mr. Fergari's hope that he will be able to publish Mr. Pollock's Ph D thesis in English - Spanish, but he has not yet found the funds to put out an edition which he considers of high enough quality for such an outstanding document. It would require Colombian pesos 2,000,000 (or dollars $ 33,000) for a large edition. budget of

and the United Nations

La Jarrita comes directly from the Presidencia and is not subject to any ministry or other institution; while Lugari's project does not lack adequate funding, the money is earmarked for special projects. Publication of Balick's thesis would be highly desirable, since the biology of the Jessenia - Oenocarpus group of palms in the world has been worked out to a degree hitherto unknown for any other group of domesticated trees. The advantage of having a clear and broad understanding of the wild progenitors of cultivated plants before the initiation of improvement and genetic and agronomical manipulation of new crop species under domestication is, of course, obvious and has in the past rarely been available.

Tuesday August 24. Bogotá.

Because of time constraints in my travel schedule, I requested Mr. Victor Patiño to fly from Cali to Bogotá for conference with me. We spent the morning in broad discussions of the proposed project and of his wide experience in the collection of palms in the American tropics. He is presently director of the Botanical Garden at Buga and serves part time as director of INCIVA (Instituto Vallecaucano de Investigaciones Científicas) and part time in the Secretaria de Agricultura del Valle. He has just been appointed to the governing board of INDERENA, the conservation arm of the Ministry of Agriculture. He is also about to begin for FAO a program of collection of germplasm of Manihot throughout Central and South America and will shortly begin this work in Peru & Paraguay. All of these collections eventually will be established at CIAT in Cali.

There is no doubt that Patiño is the most knowledgible person in tropical American palms.

Patiño has collected Guilielma extensively; he established 200 collections near Buenaventura, Colombia, gathered from the Colombian Chocó and Pacific coast, the Putumayo, the Magdalena Valley as well as from Ecuador and Costa Rica. The living collection is still extant, and most of the material is established also in Costa Rica. He has extensively collected herbarium material of Jessenia but has never collected living material; his knowledge of Jessenia is, however, very wide.

According to Patiño, any germplasm collection of palms should include the several Amazon species of Attalia which have edible seeds and which are acaulous, growing readily without a trunk which facilitates harvesting. One species A fumifera, native in Bahia is especially interesting since it yields a strong fibre as well as an edible nut.

In Patiño's opinion, there should be three germplasm banks in the Amazon: in Manáos, Iquitos and Maicaguar, near Florencia - in Brazil, Peru and Colombia respectively. In addition, as much of the material as possible should be established in Costa Rica.* He does not

overleaf >>

✓

for a germplasm bank of palms would be at Araracuara on the Río Caquetá in the Colombian Amazon. The region, once a prison colony for Colombia's worst criminals, is now a model agricultural experiment with a full staff of well trained agronomists. It is organized the Corporation de Araracuara under the sponsorship of INCORA. An additional and very significant advantage of Araracuara is special air service three weekly directly from Bogotá.

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on previous page *

A distinct advantage of Macagual is the existence there of an established Hevea nursery, under INCORA in Bogotá. There is adequate staffing to undertake the care and maintence of palm germplasm. The Hevea collections are under the direction of Ing. Carlos Alberto Torres who is actively making a germplasm collection of Hevea species from Colombian territory.

look favorably on a palm bank in the Llanos area of Colombia. And the very excellent place.

He believes that REDIVIA is a viable organization capable of carrying through to success a germ plasm collection of palms. When asked him about the cost of mounting such a collection, he could not hazard a guess since it would depend primarily on the extent of the project. He felt that there should be a more or less permanent, locally chosen but university trained group of several collectors in each participating country. These collectors should at the beginning of the project be brought together in one place — Manaos, for example — so that they can be trained in collection techniques by one or two university or agronomical school graduates who would be responsible for the direction and carrying out of the germ plasm project. This kind of organization — especially using local intelligent and dedicated collectors carefully chosen and properly trained — might greatly reduce the cost of a collecting project. The one or two directors in charge of the collectors should be mobile and continually visit and supervise the actual collectors and their work.

In response to my question as to the final steps to be taken after REDINAA decides to pursue such a collecting program, Patiño said the following.

1) Choose and coordinate the several germplasm centres with special reference to already existing facilities and staff and any areas of overlap.

2) Choose one or two supervisors of the collection.

3) Choose the local non-technical collectors, train them in one locality such as Nariño and instill in them a list of characteristics that they should keep in mind in selecting material. They should also be taught how to gather any ethnobotanical data.

Patiño is enthusiastically supportive of such a palm germplasm project and he believes that Iriartea - Oenocarpus and Euterpe - but especially Euterpe — are the best candidates.

On Wednesday, the 24th, I had lunch with Mr. Mariano Ospina Hernandez, a long time friend and MIT- and Harvard-

trained. Just back from a three year stint as Colombian ambassador to Germany, he was installed yesterday as General Manager of the Caja de Credito Agraria, perhaps the most influential agricultural organization in Colombia the purpose of which is to make loans at low interest to agriculturists. Mr. Ospina has a personal interest in Jessenia, since Dr. Balick's first field work was financed through a family corporation of the Ospina's and later was carried on by Las Garrotas. Mr. Ospina firmly believes in the future of Jessenia as a tropical crop for Colombia and has asked to be kept informed of progress on the proposed germplasm project and offered to do anything within his new position at the Caja Agraria to advise or assist the Rockefeller Foundation or any Colombian organization connected with the project. I consider that even if it is only the moral support of Ospina that is available, it will be ~~important~~ valuable because of the high esteem in which he is held in the present government of Colombia and the importance of his new position in Colombian agricultural circles.

Tuesday
August 18. Iquitos

Manaus - Iquitos 10:15 AM - 12:15 PM

At Iquitos, I met with Dr. Franklin Ayala, botanist at the Universidad de la Amazonia Peruana. This University has a respectable herbarium, only five years old but now with more than 20,000 specimens of Amazonian plants. Dr. Ayala is a relatively well trained botanist who has spent time at the Missouri Botanical Garden. He has, as students in the university, two Bora Indian boys specializing in botany. I met one (Manuel worked with Bora Indians in the communities & had something in common with him); I was surprised at his academic knowledge of plants. Dr. Ayala indicated that his small group could and would be happy to collaborate with the collection of palm germplasm in the Peruvian Amazon. I am thoroughly convinced that local personnel — especially Indians if they are properly trained in botany & agronomy — should be utilized under proper direction ~~for germplasm collection~~ and offer adequate training for germplasm collection.

The university in Iquitos has a department of forestry which might also in some aspects collabo-

rate

in germplasm collection and maintenance.

There are plans to move the entire university out of Iquitos to an area with much more space. If this materializes, there might be a hope for land and maintenance of some of the germplasm in the Iquitos region. ~~government agencies~~ should be contacted in any future germplasm project in the Peruvian Amazon: CORDILOR (Corporacion Departamental de Loreto), presided by Eng. Juan Pineda Najar; a Native Amazonian; IIDA (Institute de Investigacion de la Amazonia) which coordinates all research and peasant-extension investigation in the Peruvian Amazon.

Two

Wednesday August 19 Iquitos - Lima 10:40 AM - 12:30 PM

In spite of the dynamiting of six electric towers by guerrillas, the lack of electricity throughout Lima for two days and looting of shops, I was able to have an all-morning discussion with Dr. Carlos Valverde and his assistant Dr. Pedro Sanchez in IVITA and with the botanists, Prof. Ramón Ferreyra and Dr. Oscar Tovar, at the Museo de Historia Natural Javier Prado. The discussions were enjoyably direct and positive, quite in contrast with the vagueness and underlying competitive spirit that I sensed so frequently in Brazil.

The botanists, while interested very much in

the project, can be very limited direct help since the herbarium and most of the research is concerned with the highland and coastal flora of Peru. But they could and did offer to be of moral support to any local or foreign botanists who might be engaged in germ plasm collecting.

Dr. Valverde is president of REDINAA, and Dr. Sanchez, a soil scientist, is in addition to his post in INIPA, a professor (extension) at North Carolina State University at Raleigh. I was unable to see M. Alexander Grobman, who had (chief of INIPA) unexpectedly been called to Caracas but who had arranged the appointment with Valverde and Sanchez for me.

According to Valverde and Sanchez, REDINAA already has several (pending) proposals for joint projects in Amazonian countries, and they have drawn up a tentative list of people and institutions that might be appropriately involved. These proposals include projects in annual and perennial crops (Alcom leading perennials), pasture and forestry plans and soils studies. In REDINAA they have already discussed the advisability of germ plasm collection of plants of nutritional and/or industrial significance. They both feel that

except for Guilielma.

REDINAA can interact in any international project much more easily and freely than a ministry can. They both stated that until now they had had no problems cooperating with Brazil with the exception of Brazil's refusal to allow germplasm of Guiana to be exported to Iquitos. In answer to my question as to whether or not their cooperation with Brazil had involved the exchange of germplasm, they said that it had not. But they both appeared to be fully satisfied that there would be no problem within the framework of REDINAA.

From the Peruvian point of view, they stated that Peru is interested in developing the Amazon forest regions but that it must not be done, as in the eastern Amazon, haphazardly but after careful planning. "Every hektar of land cleared for crops must be planted with some crop that will produce while protecting the land." They recommend manual clearing to avoid compacting the soil with heavy machinery. While they tend to favor perennial crops, in particular tree crops under which other crops may be grown, Sanchez has high hopes for the success of annuals in some areas

(See Sanchez, Bandy, Villachica and Nicholaides: "Amazon basin soils - management for continuous crop production" Science 216 (1982) 821-827). The urgency of Amazonian development is due in part to the increasing scarcity of arable land along the coastal regions from which the population is heaviest. Both the banking and the president, Belaunde, have given top priority to Amazonian development.

These two gentlemen were already convinced of the importance of Ucuuba as one of the most promising crops. They were little aware of the potentialities of Jessenia, known in Peru as ungurahui. When I outlined some of the advantages of Jessenia, they became very interested. Their attention was heightened especially when I pointed out a) the chemistry of the oil (its similarity to olive oil); b) the long period, without preservative, before the oil becomes rancid (permitting its slow transport by boat to centres in the Amazon) the high protein content of the mesocarp (making it a valuable feed for pigs and poultry). They did not see that what Alvim and Arkcoll considered "slow" growth would be a drawback.

Valverde and Sanchez agreed that not one but several germplasm banks for these palms be set up in distant localities with differing conditions. For Peru, they felt that Yurimaguas (18 cm) would be far better than Iquitos because of the centre of agronomic research already there and to assure care and continuity. They already have the perennial germplasm project based in Yurimaguas: Mauritia arborea, a fast growing fruit-wood tree from Asia (but it is not successful in this region), and Ghuilielma. At Yurimaguas, they (say that they) have conducted the first fertilizer experiments ever done on Guilielma.

Sunday August 8, 1982. Flight to Brazil. 4:10 PM
8-8 Boston - Miami 12:40 PM -
Miami - Belem 10:30 PM - 8/9 5:30 AM
Monday August 9 - Tuesday August 10, Belem
Met with Dr. João Murça Pires, re-
cently retired chief of the botany section of the Goeldi
Museum and recipient for 1952-53 of a Guggenheim
Fellowship. He is undoubtedly the most knowledge-
able Brazilian botanist on the Amazon flora with a
special interest in economic plants; he is a field
botanist dedicated to the Amazon since 1944. The
Museo Goeldi herbarium is of great historical in-
terest because of the many early botanical collec-
tions. It is now housed in a new and very adequate
building on the edge of town, and eventually the
other large herbarium of the Centro de Pesquisas
de los Trópicos Umidos (formerly the (Agropecuária)
Instituto Agronômico do Norte) will be joined with
the Museo Goeldi herbarium. It will be an appro-
priate place for voucher herbarium specimens of any germ
plasm collections made in future projects on peren-
nial crops.

Monday morning was spent attempting

(2)

the Museu Goeldi, well trained and able but not a specialist in palms and in just beginning studies on the Amazon flora.

to arrange places on flights to Belem, since the Brazilian airlines had my reservations confused; because of vacations, no places were available for four days. Hence, I made my reservations to Brasilia and Manaus directly. Helio [illegible] to Dr. Percy Cabala, Alvim's colleague at Ilheus, requesting Dr. Paulo Alvim to join me if possible in Brasilia where he returned from Rio.

I met briefly with Dr. Scaff, recently retired (after 13 years) director of the Museu Goeldi who assured me that the Museu staff would gladly help in botanical matters in any germplasm collection project. Doctor Elizabeth Van den Berg, the new botanist at the Museu Goeldi who has recently been hired by IICA (of Turrialba) and transferred by CENARGEN to direct a very ambitious project to collect germplasm of Amazonian (for it) plants (economic or not), a project which will have a computer bank of data and a collection of meristem culture. According to Mrs. EMBRAPA (which CENARGEN is a part) has already authorized the establishment of a palmetum near Belem. He hope to be able to establish a duplicate palmetum at the Jari

Was likewise unable to see the sub director, Dr. José S Lourenço, who was busy all day with a visiting group of agronomists from Surinam; when I requested a meeting the following morning, I was informed that it was his day off.

especially with Mr. Marie-Victorin, an ecologist [illegible] He was honest in pointing out that this Centre lacked scientific personnel sufficient even to carry on its 16 projects involving plants and animals. The only interest he expressed concerned Guiliel ma. The only botanist now on the staff is Mr. Joaquim Jomes, a wood anatomist dedicated to Hevea, with whom I met for an hour; although a well trained scientist, he has not interest in or preparation for a palm germplasm project.

(3) And perhaps in large dead area in the great mining development area in Carajás.

project. This palmetum program be maintained will be of immediate interest for any plans to domesticate such palms as Jessenia and Euterpe oleracea because the nuclear material can then be living material, not herbarium specimens which in palms are usually of relatively little value to taxonomic research. If such a palmetum could be established and maintained, it would, in my opinion, be a crucial factor in any effort towards the domestication of these palms.

In the afternoon, I visited the Centro de Pesquisas Agropecuarias de los Trópicos Umidos. The director was in India studying the cultivation of black pepper. On August 11, I made, after seeing the living collections of Hevea clones, the herbarium and some of the laboratories, to spend an hour and a half with several members of the sections.

We discussed the feasibility of a palm germplasm collection from many aspects, especially from the possible collaboration of this Centre in such a program. Although they expressed interest and assured me that the Centre would be happy to be part of it, his statements seemed vague, and I was left with the feeling that they

were trying to please me with their answers.

In the 1940's I worked with the Instituto Agronômico do Norte and visited it again in 1969 and 1972. My present opinion of this once very promising institution is that, its excellent library and laboratory facilities notwithstanding, it is over-extended in programs, has inadequate staff to undertake any regular new project and display, albeit rather intangibly, a general lethargy. I would not think that this Centro could contribute at present to a palm germ plasm collection.

Wednesday August 11 Flight to Brasilia
Belem - Brasilia 2:40 PM - 5:45 PM

Thursday August 12 — Sunday August 15.
Brasilia

From several telephone conversations with Dr. Ahrens, it developed that he could not join me in Brasilia because he had just returned from Rio and there was to be the dedication of a new building in his institute. He did phone Dr. Fonseca Netto concerning my mission and we made an appointment with this man who is in charge of the scien-

fic programs of EMBRAPA and CENARGEN.

I spent most of August 13th. in the botany department of the Universidade de Brasilia. The institution does not have no direct connection with a Jessenia - Guilielma germplasm project, as it is located out of the humid tropics in the cerrado area. But I was able to confer with two American botanists on the staff and learn much from their knowledge and experience from working a number of years in Brazil: Dr. George Eiten and Dr. Joseph Kirkbride. From the information that I gleaned from them and from two Brazilian friends (who do not want to be identified) - one a business woman, the other a scientist - I have been informed that EMBRAPA is, in their opinion, already too big and that, while it has up to now been extremely well funded, there are indications, with the present financial conditions in Brazil, that this funding may be drastically reduced. Furthermore, they believe that there is a growing feeling in EMBRAPA against the further hiring of foreign personnel in any of its dependencies. And the almost paramount insistence that no plant material ever left Brazil was brought up on several occasions: accord-

(6)

ing to them, it is an official regulation imposed by politicians, not widely accepted by scientists. It is true, that Horace Pires Kinsey generally criticized this Brazilian regulation time, stating that "it is time that Brazil botanically become a part of the rest of the world" and recognize the mutual and biological advantage of an interchange of germ plasm. Discussion with these gentlemen brought out a further point in relation to any Tessenia - Euclid, no germ plasm project in Brazil. Every new project requiring national financing must be studied and authorized by FINEP, a financial board under the direction of Sr. Delfim Neto, Ministro de Planejamento, an economic czar. Neto promised the military government to reduce drastically the foreign debt; the contrary has happened. He is in deep water now, and I have read strong opposition to him in the Brazilian press; but he apparently is well entrenched. He is not, according to the information which these gentlemen have given me, going to find under any circumstances any project that will not bring in dollars, that will not provide lucrative material for export.

* One of the other very pertinent pieces of information which I learned from these contacts in Belém and which were later mentioned in Manáos is that Alcoa's operation in Itabuna is "nearly bankrupt." Since its funding, it has had more than ample funds from a tax levied on cacao. In the lush days, the centre ~~got~~ mushroomed, and all kinds of extra projects (new schools, free medical service for the workers, monetary contributions to civic projects, etc) were initiated. This oasis has dried up very considerably with the serious drop in world price of cacao. The feeling is that unless EMBRAPA fills the gap, Alcoa's operation will be in very dire circumstances.

Her slogan is "Brazil is in a hurry." Consequently, any rather costly enterprise such as a germ plasm collection will never be funded so long as he is in power unless it can show eventual (and the quicker the better) production of exportable material. Thus, any help that the establishment of plantations of oil or other palms might bring to the impoverished inhabitants of the Amazon would be extremely secondary to any attraction it might have to help reduce the foreign debt. *

The afternoon and part of the evening of Saturday I spent with R.E. Dalmo C. Giacometti, Chief of CENARGEN and Dr. José F. M. Valls, Investigator at Embrapa's Centro Nacional de Recursos Genéticos in Brasilia. Our discussions were frank, open and far-ranging. Both of these men are highly qualified scientists and gentlemen, well trained in the United States. After the discussions, Dr. Valls showed me through the well equipt CENARGEN facilities in Brasilia. We discussed fully and I believe straightforwardly the whole project and all of the relevant questions on my list of topics to consider.

(This is the first mention of the Amazon palm project)

C. D. Darlington

Chromosome Behavior

and the Origin of Certain

Plants

(London)

2nd ed. (1956)

12 Guayaquil

3 Museo Arqueologico de Guayaquil

ceramic pieces

Ananas

Louisville
Ky. Dec 6th 1900
Mrs. Jefferson Davis
Beauvoir
Miss.

My dear Mrs. Davis
I received your kind letter
and was glad to hear from you
and of the
Reunion. I am sorry that I
can not be with them.

I could see the arms of
the Confederate

I accept of
[illegible]

Wishing you perfect success
in your noble cause.

Yours
Virginia Clay Clopton.

Gilberto Páez

Blat, between CATIE and ETECLR.

Principia Tierra

Hay dos clases de Blat, conocidos como Blat mejorado (CATIE, 2) y el Blat de RAIZAPAG

Son muy parecidos - pero hay algunas

Collet diferencias: Hay que sembrar como 10 días

Mas temprano (esto especialmente en Julio, Agosto

y Septiembre cuando hay mucha lluvia, como en

el CATIE. Se debe sembrar ASAP en el

Germinator)

(5)

My over-all impression of CENARGEN, after the discussion and visits to their facilities in Brasilia (supported by my later association with CENARGEN personal in Manaus), is the following:

1) It is directed by a capable, dynamic agronomically trained person who has vision. It has a dedicated staff which, so far as I could judge, were well trained. One of the principal objectives of the director is to send his personal abroad to the United States or England for specialized training; furthermore, he is trying to enlist the best men and women for the jobs the organization has to do.

2) CENARGEN has at present six projects on the collection of germplasm of perennial plants and assessment of population variability (Hevea, Guarana, Babassu, Guiadova, Elais and Stevetonia), in addition to some nine similar projects on annuals. There are six persons at work on these perennial projects

but other additional personel is occasionally assigned to help. Note that three of the six are palms. EMBRAPA has 57 germ banks at present in Brazil (not dedicated to 57 plants, for eight died with forage crops and four with blanket), and more than 50% are concerned with perennial crops.

The collection of germplasm of Elaeis oleifera, a species of vital interest for the improvement of the African oil palm (E guineensis) will shortly be greatly amplified in cooperation the French institute for oil plants.

3) It is my feeling that CENARGEN, unless its scientific personel is enlarged, is already over-expanded. While the work now underway is well funded, especially done and intelligently handled, the bulk increases tremendously with each collection trip and soon, I fear, will become unwieldy, (with the present budget) especially if additional germplasm projects are initiated. I was unable to assess their expectations of more funds for expansion in the future in case of need for more trained personel.

but, I gather, in a rather casual way manner.

There is also material planted at INPA and at CENARGEN in Manaus.

A few of the other points which I raised in our discussions are directly pertinent to a feasibility report.

Dr. Giacometti and Mr Valle showed much more interest at the beginning of our talk on Euterpe Oleracea, the Assai palm, a collection of germ-plasm of which is already (apparently) under way. I believe that the material is planted in Itabuna, Bahia. They both expressed the fear that Jessenia-Oreocarpa is too slow growing, coming to fruiting, according to their information, in 12 years. I judged that they had this opinion from Dr. Ahrens who had expressed it to me. After I pointed out some of the extraordinary and unusual attributes of Jessenia, I asked them if 10 or 12 years was too long a time to wait for such a promising crop, that this period of time was short compared to the years ahead that the crop could supply an outlet for their much needed export trade and for their desperately needed income for the developing Amazon. And I pointed out further that Hevea, which CEINARGEN is actively now studied, taken from

to ask about Murca's certainty that he was authorized to establish palmeta and that the project had already been funded.

(11)

(And they eventually spoke enthusiastically of such a project.)

eight to nine

years before tapping can be initiated and yields little until the 11th or 12th years. They both appeared then to take a much more positive viewpoint, and the discussion proceeded on the feasibility of a project on jessenia and several other palms, & it is my belief that their apparent initial antipathy stemmed from a) their source's (Clum's) viewpoints and b) fear that their present group might not be able to handle an additional project.

No collections of Jessenia germ plasm now exist in Brazil, except for a small one which Kirkcall has gathered at INPA and which, according to Giacometti, be terminated because of the slow growth of the palm.

Re to what institutions or facilities could maintain a Jessenia collection, Giacomitti responded that CEMARGEN would be responsible and possibly could establish a palmetum in the Jaiandone in Manaus in case a palm project were to be funded. [illegible] noted to myself but felt it imprudent.

Giacometti said that he knew very little about REDINAA or of its interest in such a project,

He stated that any decisions, even tentative ones, on this matter would be academic until the project were initiated. He suggested, stating that such an interchange would be basically crucial before any concrete steps were taken, and reiterated my belief that plants [illegible] industry is based on an imported African plant - cotton.

(12) a point which I found it hard to accept in view of his wide knowledge of the Amazon and his high position.

He discussed at great length the question of the interchange of material between the cooperating Amazonian countries. He stated that there is no Brazilian regulation against the interchange of materials so long as the exchange be mutual, pointing out that a joint Brazilian-French project on Elaeis oleifera was easily authorized because the French were willing to provide some of their high-yielding clones of E. guineensis from Africa. He pointed out that for both Jessenia and Guilielma, the greatest variability in populations and to some extent the apparently best (most integrity) variants occur in the western Amazonas, in Colombia, Peru & Ecuador, and that, consequently, an exchange of material with these countries would eventually be to Brazil's advantage. He agreed and said that the authorization for any exchange of material would have to go to the president of EMBRAPA, Dr Eliseu Roberto de Andrade Alves, an agricultural economist, who would (immediately) turn the problem over to him (for decision) to Giacometti. Pointing out that I was going to visit Peru & Colombia for the same purpose that had brought me

tages of domestication of these specific plants. In this proposal, he noted, could be included an explanation of the need for exchange of germ plasm and the reasons for establishment of the germ plasm in three or four different localities. Following discussion of the proposal by the several REDINAA countries, then REDINAA should seek ~~from~~ governmental funds for the project. Rockefeller should have a representative at the REDINAA meeting who could discuss any Rockefeller input.

to Brazil, Jacketram would be free to inform officials in other Amazonian countries and possibly in Costa Rica that preparations in Brazil would permit interchange of material; he said that I could so assure them. When I asked him if he would be willing to put this in a letter to Dr. Tennessen to attach to my feasibility report, his response was that it should await the presentation of a concrete proposal from REDINAA or from the Rockefeller Foundation and that a letter to that effect would have to come from the president of EMBRAPA, even though he himself would be the person making the decision.

Giacometti stated that the next step would be for REDINAA to send a project proposal to the president of EMBRAPA. Included in it should be ~~an evaluation~~ a draft of the importance of evaluation of variability in the palms which are chosen and the advan-

Monday August 16. Flight to Manáos. Belém-Manáos 1:45 A.M — 4:10 A.M

Monday August 16 — Wednesday August 18 Manáos.

My time at Manáos was extremely profitable thanks to the help which I received from Dr.

Main thrust of Absey's a palmatologist

From several sources I learned that the new director of INPA hails from southern Brazil and that he is attempting to fill the staff with non-Amazonian Brazilians and would like to reduce the number of foreigners at INPA. There is much discontent, especially in the botanical section where he has appointed as chief an ambitious young lady from southern Brazil, by-passing scientists of long association in the section: Dr. William Rodrigues fortunately has had a Guggenheim fellowship in the New York Botanical Garden this past year, but he is said to be very dissatisfied with the reorganization; Dr. [illegible] Lleras, a Colombian who had been at INPA for eight or nine years resigned and left. I was unable to meet the director, although I left my card three times.

Dr. Heraldo Armando Mathias
assistant Sydney Ferreira

David P. Arkcoll of INPA (Instituto Nacional de Pesquisas da Amazônia) who dedicated two full days and evenings to my visit. In addition, the agronomist at SUPLAC in Manaus, to whom Dr. Alencar had telephoned to announce my arrival, were most helpful, especially in providing transportation to the field experiments their direction. I was able to see not only the work at these two institutions in palms but also their projects in cacao, rubber, guarana and other plants.

Dr. Alencar was unable to join me in Manaus, but I feel that I was well and adequately taken care of during my visit which I was forced to cut by one day due to the scheduling of the flight to Belem.

I spent all of Monday at INPA and all of Tuesday visiting the several EMBRAPA projects.

Dr. Charles Clement was not at INPA nor was Mr. Jeff Smyth there, so my main source of information was Dr. Arkcoll who is in the Division of Agroecologia of the Institute.

Dr. Arkcoll is a highly trained and extremely

He has some 100 Guilielma trees (20 from Costa Rica and the rest Amazonian) planted elsewhere. They are doing equally well.
Time did not allow me to visit the site.

hard working and capable scientist. In addition to his interest in palms, he has other projects under way - eg., 150 types of blanchot with yields of 50 - 70 tons per hectare. Some of these were selected for high carotene content and were sent to CENARGEN in Bahia and, according to his information, many were lost because they had been selected for drier condition and did not prosper in the wetter environment there; the collection was entrusted to a staff member at Belem who, upon superficial examination, eliminated many of the selections; some had to be recollected. Arkcoll says that EMBRAPA is now doing much better job with the blanchot.

Arkcoll is very much interested in Guilielma and has a small patch growing at INPA. They are extremely fast growing here, reaching a height of some 35 feet in four and one half years with some fruiting the first year when they were so low that the branches of fruit were at ground level. CENARGEN is financing the Guilielma work at INPA. He feels that the work on the palm at INPA, although limited, is much more serious than that being done by CEPLAC;

It is Arkcoll's suggestion that, insofar as Brazil is concerned, Rockefeller Foundation might well think of interdisciplinary education of personnel connected with any REDIMA germplasm collection. One of the great lacks, he feels, is that agronomists know little or nothing about botany, botanists are ignorant of basic soil science and each specialist stays in his little house. All, he feels, should have to take a broad economic botany course at the start of any such project.

IRRI is now getting very little international money, according to him, that the international agencies supplying the funds "got fed up with the evaporation of the money with little to show for it."

he stated that he felt that INPA was "working on the palms" whereas he intimated that CEPLAC was "playing with the palms". His principal criticism of INPA centred on two related points: lack of continuity and lack of funds. Concerning the first, he mentioned the several Guilielma collections made by CEPADO during the 1950's which were abandoned in the 1960's, so that INPA had to repeat many of them. He stated that the lack of continuity is not confined to INPA, for similar collections of this palm were abandoned at Buenaventura (Colombia) and Turrialba (Costa Rica). Concerning the second, he said that he felt that EMBRAPA might be trying to take over INPA and that "perhaps financially it might be an advantage".

Arecell's interest in Guilielma is two-fold: as a source of starch and of oil. Most of the interest to date has been given to the large-fruited type which the Indians have selected as a source of food. Some of the small-fruited types with thin mesocarp, he finds, are far richer in oil — some which he has selected (mostly from native markets) have up to 30% dry weight in oil.

Astrocaryum Tucuma is slow-growing and has a year and a half dormancy period. It does well in waste land, such as abandoned pastures. There are two types of fruit — one in the mesocarp, the other in the seed. ENPA has some types which have 50 - 70% oil content of dry pulp. There is said still to be a small amount of the two oils, all produced by wild trees. The fruits are very often found on sale as edible nuts in local markets but they are small, measuring usually only 1.8 cm. diameter × 5 cm. length with a very thin mesocarp. Ark coll has found types with mesocarp measuring 4 to 4.5 mm., but it is usually 1 — 2 mm. thick. The flavour is sweet and nutty. Any germplasm effort in *Astrocaryum* should look for faster growing trees and thicker pulp.

exported

(selling at Cr. 300 a dozen)

Astrocaryum could probably be a good shade tree, better than *Jessenia* or *Jubiaea*, because the crown has very few leaves and more trees could be packed into a given area.

Mauritia, the buriti palm; and

A second palm which interests Ackcell is Astrocaryum which he feels has great promise as a source of edible nuts and oil. Some which he has purchased in native markets are extremely high in oil, so high that the oil can be easily expressed by merely squeezing it between the fingers. He definitely thinks that two species of Astrocaryum (A. Tucuma, sometimes called A. vulgare and A. Murumuru) should be included in any germplasm project. He has experimented also with Euterpe oleracea, the assai palm; he found assai extremely slow-growing at INPA, and he does not look favorably on devoting much attention to it.

Ackcell has a few Jessenia trees planted at INPA. He finds them slow-growing. In my own opinion, they are not in a suitable location, and he agrees that this may be true and that the few trees, locally collected, are too few to use as the basis for decision. In our long conversations, I pointed out some of the advantages of Jessenia and expressed my feeling that 12-15 years is not too long a period for a tropical tree crop, and he seemed to

Arkcoll believes that Oenocarpus might be a better plant than Jessenia, since the oil is the same, the tree may grow a little faster and it matures earlier. (There is some doubt in my mind that Jessenia and Oenocarpus are distinct genera, but Balick maintains them separate.)

According to Arkcoll, 32 tons of the whole fruit of Jessenia bataua were processed from wild trees in 1965. In 1977, he reports, 29 tons of kernels of Astrocaryum Murumuru were processed from wild trees. This indicates that there is a local market in Brazil.

Aroeira oil palm

look more favourably on devoting more and consistent attention to the palm if a wider selection of germplasm could be collected.

On Tuesday, Mr. Arias and Mr. Ferreira took me to the EMBRAPA stations for Hevea and (CNPSD, Centro Nacional de Pesquisas de Seringueira e Dende), where I spoke with Dr. Paulo de Souza Gonçalves, in charge of rubber research, and Dr. Soi Chee Ooi, a Malaysian oil palm geneticist acting as consultant to EMBRAPA-IICA. We toured part of the Hevea experimental plots and I was impressed with the collections, only about five years established, and with the seriousness and scientific sophistication of the operation (My own specialty is Hevea, and I felt that I was well able to judge this work). We did not visit the Dendê germplasm plots. I then spent nearly an hour with Dr. Soi who believes that Brazil and other countries of the Amazon would be losing a golden opportunity if they did not now begin a serious and wide palm germplasm collection. He is, of course, most interested in E. oleifera because of its genetic importance

Some of the conditions of Dr. Gonçalves

The guaraná experimentia in the capable hands of the agronomist Carlos Lazzarini, who showed us around the fields.

The palm seems to be an excellent shade tree for cacao.

for the changing and improvement of the African oil palm. He did, however, express enthusiasm for what he termed the "industrial potential for oil" in numerous native palms of the American tropics.

I visited the library of this recently established institute and found it extraordinarily complete, even with some of my own publications in very obscure journals.

It is clear from this Centro that EMBRAPA is capable of real and well directed scientific research of an experimental nature.

We spent the afternoon driving to KM. 30 on the Manaos - Itacoatiara Road and saw the guaraná experiment. There are more than 100 plants of guaraná in vigorous growth and about 100 trees of Euterpe. We were unable because of time to drive to KM. 60 on the Road to Caracaraí where EMBRAPA has more than 300 trees of Euterpe (50 of them the spineless type) which are being tested for shading cacao. The germplasm bank is said also to have some trees of Euterpe mattogrossensis and E. microcarpa, this last species collected in Amazonian Peru and

Mr Lidio Coradin, a very important person who is EMBRAPA's coordinator of botanical exploration and germplasm collection, was unfortunately not in Manáos, and I was unable to meet with him. Furthermore, I was not able to see Mr Cherian Clement (whom I met last year when he was working on palms at Tarrauba), since he was on vacation.

now considered to be the ancestor of the cultivated *E. speciosa*.

IMPA originally supplied the stock for the jussarané and Guilielma plantings at the several EMBRAPA stations.

CENARGEN hopes to begin a germplasm collection of *Elaeis oleifera*. This project is said to have been funded four or six months ago, but no one has as yet seen any money for the program. There are about 100 collections already made, and the next expedition (I presume to one with the French) is expected to produce 500 more. These will be under the direction of Dr. Soi. They will be divided between Manaus, Belem and Itabuna, but apparently none will go to Malaysia although there are said to be preliminary discussions between EMBRAPA and PORIM (Palm Oil Research Institute of Malaysia) on this point. There are two different types of *E. oleifera* — one native to northern S. America (Colombia) and Central America and the other in Brazil the former with small fruit, the latter with larger fruits.

He stated that CATIE would not be interested in any grant from REDINAA but would ~~[illegible]~~ prefer to make bilateral agreements with American or European governmental, organizations or foundation such as Rockefeller. "I would not put a dollar into REDINAA, if I were an investor. What I saw ~~[illegible]~~ recent trip to ~~[illegible]~~ really disappointing. The work in Peru was very lacking, but even that is a sad situation."

Travel from
Thursday August 26, Bogotá to Turrialba, Costa Rica. Bogotá - Panamá 10:45 - 12:05PM; Panamá - San José 12:45PM - 12:45PM. San José - Turrialba (by car) 1:45PM - 3:15PM.

Thursday August 26 Turrialba (CATIE).

It was a joyful relief to come to ~~CATIE~~ Costa Rica where agricultural specialists know where they are going and have had consistent programs. CATIE should definitely be involved in the proposed REDINAA-sponsored Jessenia - Guilielma project.

On Thursday, I spent several hours with Dr. Jorge León, recently retired director of CATIE and ~~one~~ widely recognized authority on cultivated tropical crops. León did not know anything about REDINAA, and he was straightforward in ~~his~~ expressing his apprehension about ~~some~~ loose, international organizations ~~doing~~ carrying out any significant long term project.

León was fully in agreement that CATIE could establish in Costa Rica more Guilielma germplasm and Jessenia as well. He said that he felt that the new director (whom I could not see due to his absence) would agree. CATIE has land, centers,

– even tissue culture experts at work on bananas and plantain, the collaboration of Dr. T. Z Germa and A I D –

18° of latitude and 90 minutes due from Turrialba

Q ✓ They have Cupeí at Turrialba (1800 feet) and a La Lola (~~1500 feet~~) and extensive Gualdilma plantings and both localities. ~~Dr~~ A Costa Rican organization called ASBANA has very extensive plantings at La Anita (900 feet) near Los Diamantes at Guapiles.

Q ✓ He may also get a grant from A I D to develop "non-conventional" ~~crops~~ perennial crops; both Gualdilma and Jessenia would fall into this grant if it is funded. It is my understanding that this proposal has already been made.

Q ✓ In Leon, he once discussed a grant from Rockefeller

According to Acelial Jessenia, ~~but he thought it was out~~ with W. Rachie ~~but nobody pursued it~~, who promised to look into it, but León ~~heard~~ nothing more about it.

laboratories, personel, etc, but lacks funds to maintain any additional extensive bank. CATIE is at the moment interested in presenting a proposal for help in its Guilielma work, as they have heard (I cannot believe that it is so) that the Smithsonian Institution, hitherto dedicated to "pure" science is now becoming involved in botany of a practical nature. His information comes from the Smithsonian station in Panama which reports that they feel that they should be providing in their scientific research something of practical use to the host nation.

Guilielma is, naturally, CATIE's prime interest at the moment, and Costa Rica is the country where this crop is most widely used for many purposes. There are Guilielma plantations only for exporting palm hearts. The palm in Costa Rica can be commercially successful up to 2400 feet, although it can grow well at even higher altitudes. There is at present pressure to try to replace pejibay meal for maize as a cattle feed. CATIE has trials that yield 500 pounds a year, a theoretical 200T per hektar a year. (add overleaf here)

León, who has recently re-

~~Cotte Tax~~

León had hired us a collector to get Orquídea from Venezuela when he hoped to procure financial help to initiate this program. The collector is still available.

turned from Brazil, was critical of Brazil's work on Euterpe; he was gently critical of both Allem and Arkcoll. Allem he fears, is spread too thin and Tar Heel is to take over programs which other agencies have started & have had much experience over
He spoke flatly that "Brazil has no Brazilian specializing on Euterpe".

Arkcoll, he definitely stated, was interested in too many small projects and tended to be critical of almost anyone working on projects similar to his.

I was surprised when Leon told me that he had heard that Clement might be leaving Manaos to go back to school in the United States
(but was not certain of the accuracy of the report)

On Friday afternoon, I spent four and a half hours with Dr. Jorge Mora Urpi, now dean of Sciences at the Universidad de Costa Rica. I came away with the impression that this man knows more about Guilielma and palms in general and has had more success in seed plasm collection than anyone, including Victor Patiño. He spent two years at Berkeley and earned his doctorate at the University of Kansas in genetics in 1963. Over the past few years - before becoming burdened

Itabuna (and to some extent Brasilia) he says have "fixed ideas", in contrast to what has always been stressed in Costa Rica: trying out new ideas, unconventional approaches.

with university bureaucracy, he personally amassed the extensive collections of Guilielma germ plasm that exists to-day in Costa Rica. He travelled widely in Pioneer-time and did all of the collecting himself, helped only by local collectors in the foreign countries. He was a very modest person but was a man of intense interest in both theoretical and practical botany and a scientist not given to easy and sweeping answers to complex questions.

Dr. Mora has published numerous papers in learned journals of the highest calibre. She was especially interested in the theory that Guilielma speciosa is of hybrid origin but that it has had several hybrid origins from crosses of different ancestors in different regions. He was able to distinguish geographical races not only from South America but can distinguish populations from the Atlantic and from the Pacific coasts of Costa Rica. From his research, it has been shown that four populations in Guanacaste (one local and three from Costa Rica) differ markedly in the composition of their fatty acids: the explanation is that they have been isolated for so long that they have evolved in different climates.

Dr. Mora stated that Guiteiman has many uses and many advantages but that it has one disadvantage. It has an inhibition of the toxic substance trypsin; this substance can be destroyed by cooking. The changes in pH ~~it~~ breaks down the trypsin. Consequently, ~~it must be adequately~~ this food must be cooked, even when used as food for cows.

Most of the conference was devoted to very complex and significant genetic discussion. He did, however, pledge his aid and that of any of his students to the ~~extraterritorial~~ exploratory in Costa Rica of its ~~tropical~~ germplasm bank and, although he did not know Jeremia to additional material of this Amazonian palm.

He, like Jorge Leon, was apprehensive about working under the direction and with the limitations of REDINAA or any similar international political organization. His suggestion was that any assistance that any major organization might give towards the collection and maintenance of germ plasm should come directly from ~~the~~ institutions ~~and~~ the granting institution (~~preferably~~ selected ~~if~~ directly to the ~~individuals~~

University of Costa Rica, CATTLE or other small organizations, not to the heavily bureaucratic organizations in Colombia,

Boyd has done it, can
N.F education ... Western
Other Cons centers do not
N.F. Interdisciplinary approach should be
(Econ, Pol.) — agronomists to have
botany, botanists to learn of
agronomy, etc.

Dr. Stephen B Brush
Anthropology Program
N.S.F Wash. 20550

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in the Americas"

CETYARGETY - beginning to fund
E. oleifera etc. but no money yet
— intend RF Cory term. funding &
maintenance of 5x pl. banks so
that their future would be protected.

(Em has 100 types of E. oleifera already
need afford will have 500. 50 pl.
as consultant by E-M PA BA.

Nduaca, Bako, Itafuna, move to Malaysia
discussed pos. exchange.

Born in Peru
Guillermo Criollo Diaz

Send Plantas Alucinogenas to
Ayala. Te Patiño

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